Vol. 193 83rd Year No. 3538

THE GAS JOURNAL

MARCH 11, 1931

A Glance at the Contents—

New " W-D " Verticals at Rugeley.

An account is published of the official inspection last week of a continuous vertical retort installation erected at the Works of the Rugeley Gas Company by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd.

Gas Companies' Results in 1930.

We publish to-day reports of a large number of meetings of provincial gas companies, including Barnet, Chichester, Cork, Derby, Exeter, Gloucester, Harrogate, Ipswich, Newcastle, Reading, Rochester, Scarborough, South Shields, Sunderland, Tonbridge, and Watford.

Dundee Gasholder Subsidence Inquiry.

An inquiry into the administration of the Gas Department of the Dundee Corporation was conducted before the Lord Provost's Committee on March 6. The proceedings had special reference to the Lochee gasholder, which, as has been noticed in the " JOURNAL," subsided shortly after it was erected last year owing to insecure foundations laid by the Gas Department.

Official Changes at Tunbridge Wells.

It will be seen from our Personal Column that Mr. C. F. Catt, Secretary to the Tunbridge Wells Gas Company, is to retire from this position at the end of this month, after 46 years' service with the Company. Mr. F. J. Brampton has been appointed to the post of Secretary. Another interesting appointment is that of the Chief Engineer, Mr. L. J. Langford, who becomes General Manager.

Film of Holmes Products.

A report is published of a meeting of the London and Southern District Junior Gas Association held on Feb. 27. The technical proceedings consisted of an exhibition of two cinematograph films showing the design, manufacture, erection, and testing of the gas-works and bye-product plant of Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, and of their " Connersville " meters, exhausters, and boosters.

Manchester District Institution.

In his Presidential Address to the Manchester District Institution of Gas Engineers, Col. W. M. Carr refers to the proposed change in the title of the organization—a suggestion made at the instance of the Institution of Gas Engineers. Among many other interesting current topics, Col. Carr refers to the industrial load of our Industry. " This," he says, " is not to be attained by the setting-up of a showroom containing a few standard furnaces, but rather by applying ourselves to the problems in the manufacturers' works themselves." Our readers will find of great utility his remarks on waste-heat recovery, refractory materials, ammonia washing, Congdon scrubber-standpipes, the " N.O.C." process, the dilution of coal gas by producer gas, and the marketing of coke. In regard to the last-named phase, he explains that at Stretford a salesman is employed whose time is almost entirely devoted to the sale and marketing of coke, and in attending to service to the buyers; and as a result of his salesmanship, coupled with careful attention to quality, Stretford has had no difficulty in disposing of the whole of its production of coke within its own area during the past five years.

Cheltenham Gas Order.

A report appears of a Board of Trade Inquiry into a Special Order promoted by the Cheltenham Gas Light and Coke Company. The main purposes of the Order are to authorize the Company to purchase by agreement the undertakings of the Tewkesbury Gas Company, Ltd., and the Winchcomb Gas Light and Coke Company, Ltd.; to include within its area of supply a number of parishes in various rural districts which, in the course of time, can be conveniently supplied from Cheltenham, particularly in view of the proposed amalgamation; to change the name of the Cheltenham Company to " The Cheltenham and District Gas Company; " to extend the Company's borrowing powers; and to modernize the Company's legislation.

Advancement of the Gas Industry.

The Annual Meeting of the Manchester Regional Joint Industrial Council for the Gas Industry was held in Chester last week. At a luncheon given by the Directors of the Runcorn Gas Company, Councillor J. Williams (Manchester), in proposing the toast of " The Gas Industry," said that the close organization between employer and employee which has been brought about since the war has bred a common interest, and there is scarcely a man from the top of the Industry right down to the bottom who does not share in the wish for the advancement of the general welfare, and feels keen resentment at the unfair treatment meted out. Mr. Williams was referring to out-of-date legislation and to the Minister of Transport's boosting of electricity at the expense of gas.

New Rust Preventive.

A few days ago we had explained to us a new rust preventive. Known as " Nust " this material is a liquefied lead, and is employed for coating iron and steel. The first discovery of " Nust " was made some ten years ago by a Swiss professor, who is adviser to the Swiss Federal Railways on rust-proof questions, and a member of the German Imperial Commission on the protection of metals. He found he could so treat lead that it could be applied as paint. The oil which is contained in " Nust " is merely a conveyor to hold the lead so that it can eat its way into the iron or steel, and form a positive amalgamation with it. This impregnation, we were told, is absolutely impervious to the action of rust. Applied (with a brush) in one coat, it is sufficient for the purpose. It can be used as a primer, and other paints applied.

New Storage Water Heater.

Particulars are given of a new storage heater called the " Optimax," described by M. Mutrux in Monats-Bulletin des Schweizer. Verein von Gas- und Wasserfachmännern. So far, two sizes are available, 28 and 39 gallons. The output is 225 gallons of water per day at 167°-176° Fahr. depending on the pressure and calorific value of the gas. The small size enables two baths, at a temperature of 102°-104° Fahr. to be prepared at once; the large size, three baths. According to the Federal Laboratory for Fuel Testing, the daily capacity is 12-15 baths, depending on their volume and temperature; the smaller model with feed water at 50° Fahr. gave 330 gallons of hot water at 142° Fahr. in 24 hours, or 240 gallons at 176° Fahr. As a geyser, the capacity is 16 gallons of water in 1 hour with a temperature rise of 58° Fahr.

EDITORIAL NOTES

Electrical Opinion on Recent Propaganda

MR. GEORGE BALFOUR, M.P., the Chairman of the Midland Counties Electric Supply Company, Ltd., has performed a notable service to the industry which he represents, in ranging himself alongside Sir David Milne-Watson and Dr. Carpenter in criticizing the Minister of Transport's pro-electricity propaganda. We have known all along that a large body of responsible electrical opinion must deplore a course of action which, besides being at variance with precedent, was in the worst possible taste, and calculated to inspire the belief that those whom it purported to serve were in dire need of adventitious aid. It has, however, been left to Mr. Balfour to express publicly, with a courage and candour which all fair-minded persons must applaud, the feelings of the electricity industry. It is to be hoped that the Minister of Transport, who, though obviously shaken by the criticism which has very properly been levelled at him from all parts of the country by those responsible for gas supply, still proclaims himself unrepentant, will at last perceive that his efforts, however well-intentioned, have merely caused embarrassment to those whom he sought to aid, and that in future his electricity activities should be confined to answering for the industry—to use his own ambiguous phrase—in the House of Commons, but nowhere else.

We do not, of course, wish him to abandon his all-electric house—about which he has let us hear so much—though from humanitarian motives we would like to assure him, on the expert testimony of Sir Frank Heath, President of the British Electrical and Allied Industries Research Association, that he would get much better toast if he would so far depart from his expensive hobby as to use gas for the making of it. To some within the Electricity Supply Industry Mr. Balfour's utterance will, of course, be extremely unpalatable, and particularly to persons like those who stigmatized as "sabotage from inside" the remarks of Sir Frank Heath which were reproduced on p. 493 of the "JOURNAL" for Feb. 25. The vast majority will, however, give their unqualified approval; for a plea for fair play never falls unheeded upon British ears.

On Many Things

SEVERAL current problems which confront our industry are discussed in a most interesting manner by Col. W. M. Carr, in his Address as President of the Manchester District Institution of Gas Engineers. This Address, which will be found on later pages, adds lustre to the reputation of the author as a keen engineer and broad-minded administrator of a successful gas undertaking, and it is certain to be widely read. Without making any endeavour to survey the address as a whole, we feel that emphasis should be laid on a few of the gas making and selling practices in force at Stretford, and on the soundness of the ideas which underlie these practices, from the points of view of both chemical engineering and far-seeing salesmanship.

In this connection, perhaps one of the most significant sections of the address relates to the effects of methods of charge and service on the industrial load of the Stretford Undertaking. In regard to the former, the introduction of an optional two-part system of charge for industrial users has, to quote Col. Carr, "proved of the greatest benefit in increasing the consumption and improving the load factor." The change was brought into operation at March 31, 1928. In two years the industrial sales grew by no less than 45·6 p.ct.—from 798,709 to 1,156,826 therms. And of the total gas sold for industrial purposes, 78 p.ct. was sold under the two-part system. The basis of the tariff is the maximum twelve-hour demand, and this has encouraged large consumers to distribute their heating load over the twenty-four hours. As to service—and we suggest that the two-part tariff in itself would not have resulted in the 45·6 p.ct. increase in sales—there is no doubt that Col. Carr is right when he urges that stereotyped rules cannot apply to industrial service and advice. Almost every application of gas to industry demands special consideration to meet the particular requirements of the manufacturer. While in some instances a standard furnace can be found which will meet the requirements, in many others specially constructed furnaces are essential if gas is to be employed to the best advantage.

In this regard Col. Carr acknowledges the help he has received from the Birmingham Gas Department's Industrial Research Staff, which assistance is gladly afforded to other undertakings. This co-operation ought to be developed further, for without it the industrial load will not be increased at anything like the proper rate. Let us explain more fully what we have in mind. There are two undertakings separated by a distance of (say) three hundred miles. One is about to tackle an industrial proposition in competition with oil fuel. The information at its disposal is seemingly meagre, and the approach is therefore in the nature of an experiment. The other undertaking may have dealt successfully with a similar sales problem involving the same competitive considerations, and may be only too willing to place its knowledge at the disposal of the undertaking that needs it. Through lack of a definite link between the two concerns valuable information may be wasted on the desert air. There is a remedy at hand—better co-ordination, on a wider basis, of information gained by undertakings throughout the country.

Another salesmanship topic of great interest dealt with by Col. Carr is that of salesmen's compensation. To encourage all members of the staff who are in touch with the consumers to make openings for new business, a system of commission payments on sales was introduced at Stretford some six months ago. The commissions are small, and are paid to the employee who initiates the inquiry. For example, a fitter, maintenance man, or meter inspector may interest a consumer in some appliance, and reports having done so; this interest or inquiry is followed up by the selling staff, and if and when the business is secured—no matter through what channel—the commission is paid to the responsible employee. This system, states Col. Carr, is proving very effective; and it has not resulted in an appreciable increase in the time taken for work on consumers' premises. The author's remarks on a continuous billing system which is at present being introduced at Stretford are of much interest.

Turning now for a moment to what may be termed the engineering side of the address, we would call attention to Col. Carr's observations on gas grids. He points in particular to the danger of underestimating the cost of unproductive mains in a grid covering a large area. "This fact is patent in the electrical industry, where it has been found that savings effected by super-generating stations in many instances are lost in the extra cost of distributing over a large area, and that the electricity grid cannot, therefore, afford a cheaper supply of electricity than was originally afforded by the separate undertaking, which was well equipped and managed. Taking into account standing and other charges, there can be little difference in the cost of manufacture in an undertaking of normal size and the cost of purchasing unpurified coke oven gas." The author sets out a tabular comparison of the cost of gas into holder at Stretford and at another undertaking which sells 1000 million c.ft. of gas per annum, all of which is purchased from coke ovens. The respective figures are 11·17d. and 10·9d. The undertaking compared is in close proximity to the coke ovens from which it draws its supplies; and Col. Carr suggests that the cost into holder would have been

at least 2d. per 1000 c.ft. more if it included the standing charges of a gas grid.

The foregoing represent a few only of the questions treated by Col. Carr; and our readers will find of great utility his remarks on waste-heat recovery, refractory materials, ammonia washing, Congdon scrubber-standpipes, the " N.O.C." process, the dilution of coal gas by producer gas, and the marketing of coke. In regard to the last-named phase, he explains that at Stretford a salesman is employed whose time is almost entirely devoted to the sale and marketing of coke, and in attending to service to the buyers; and as a result of his salesmanship, coupled with careful attention to quality, Stretford has had no difficulty in disposing of the whole of its production of coke within its own area during the past five years.

Monthly Accounts

THE system of monthly accounts for gas undertakings has been adopted both in the United States and in this country to an extent which may be regarded as having removed it entirely from the realm of theory into that of practice. In the first issue of the " JOURNAL " published this year we were able to announce the decision of the Board of the Brighton and Hove General Gas Company to do as the South Metropolitan and the South Suburban Gas Companies are doing in this respect; and at last week's meeting of the Lea Bridge District Gas Company Mr. A. M. Paddon, the Chairman, alluded to the fact that a change-over to monthly accounting has been accomplished also by that undertaking.

Mr. Paddon has all along looked upon this as one of the most important reforms that the gas industry can adopt—which is, perhaps, placing the matter even higher than we ourselves have ventured to do when on several occasions expressing views favourable to the policy. And he is a gas administrator of very wide experience; while the fact that he is on the Boards of two Companies who are already working on the monthly account method and of a third Company who have determined to put it into operation, proves his complete knowledge of the details of the system as applied to a gas undertaking, and bears irrefutable testimony to its success in practice. In the report of the Lea Bridge meeting which appears on another page of this issue, Mr. Paddon's remarks on the subject are reproduced, and they are definitely to the effect that the system has proved beneficial, whether with reference to the consumer or the undertaking. In some cases quarterly accounts have led to restriction in the use of gas, and there has also been the question of return of appliances on hire, which is now almost entirely obviated. Another point in favour of the new system is the falling-off which has resulted in the number of disputed accounts. The experience being what it is, we may expect to hear of further Companies adopting the system.

While on the subject of accounts, it may be noted that, as was explained by Col. Carr in his Presidential Address to the Manchester Institution, a system of continuous billing is being introduced into the Stretford Gas Undertaking. Under this system, an equal number of accounts will be sent out to consumers on each working day of the year. Thus the number of consumers visiting the showrooms to pay accounts will be constant, and not confined as at present to the quarterly rushes. In this way, greater opportunities will be afforded the selling staff in the showrooms. With quarterly billing and discount days, it is found that, unless the showroom staff is very considerably reinforced during these periods, the selling staff are unable to give sufficient attention to the large number of consumers coming into the showrooms.

The Swansea Gas Company have adopted machine billing, which has resulted in the consumers' accounts being delivered within three or four days after the reading of the meters. This, said the Chairman of the Company (Mr. Ernest H. Leeder), when addressing the proprietors at the meeting, " has been welcomed by consumers, as it affords them an immediate opportunity of checking their accounts; and it is advantageous to the Company, inasmuch as the work incidental to the preparation, despatch, and receipting of accounts can now be carried on at a more even rate, and with an almost total absence of those periodic ' peaks ' of pressure unavoidable with the old system."

Salesmanship at the Fair

WHILE all the nice things that have been said about the recent British Industries Fair are still in mind, it is as well to draw attention to the criticism of the salesmanship which was made in " The Times " a few days ago by Sir Francis Goodenough, as President of the Incorporated Sales Managers' Association. Sir Francis warmly congratulates both organizers and exhibitors on the increased magnitude of their effort, the increased flow of visitors, and the continued improvement in the presentation of the exhibits. His one point of criticism—directed, of course, to enhancing the value of the Fair in future years—is that: " With striking exceptions (which happily were more numerous than a year ago) the salesmanship was not worthy of the exhibits."

The British Industries Fair, as Sir Francis points out, is no ordinary exhibition, largely thronged with a casual and vaguely curious public. It is indeed, an annual fixture of national import, in connection with which no opportunity of securing still greater usefulness should be missed. The country cannot afford that any such opportunity should be missed. Chapter and verse, in the form of a memorandum by the Chief Interpreter at the Olympia Fair, are quoted by Sir Francis, who says that, if the potential harvest of the Fair is to be reaped, " manufacturers must not content themselves with merely taking space and staging attractive exhibits. Unless they are to waste a large part of their expenditure, they must face the trouble and cost of putting their stands in the charge of thoroughly equipped salesmen, or even of principals themselves. Those who have adopted that policy have been well rewarded with orders, while others occupying equally good stands in equally good positions, who have neglected the question of representation, complain of the paucity of business."

The Trade Disputes Bill

THE decision of the Government to withdraw the Trade Disputes and Trade Unions (Amendment) Bill, following upon the success of the Liberal amendment in Committee, is hardly surprising, in view of the attitude of the General Council of the Trade Union Congress; and until another Bill is introduced in its place, industrialists will in all probability breathe a little more freely. The position is difficult enough, and there is a sufficiency of rocks ahead, without anything in the nature of the Bill referred to. Persons who had no desire to deny a man the right to bestow his labour as he listeth, yet saw grave reason for fear in a clause which apparently would have permitted combinations of men to inflict incalculable injury upon the community, inasmuch as it would have left a general strike free to run its course until its legality, judged by the terms of the limiting clause, had been tested by the Courts, by which time—an indefinite period, of course—anything might have happened.

The circumstances attending the general strike of 1926 are still too fresh in the public mind for the smallest possibility of a repetition to prove popular, and therefore outside Trade Union circles there could be little enthusiasm for a measure that was calculated to undo much of the good accomplished by the Trade Disputes Act of 1927. There are more serious problems confronting both employees and employers at the present time than the sharpening of strike or lock-out weapons, and the Government will be well advised to devote entire attention to these. Greater goodwill and closer co-operation between master and man will do more for individual and communal prosperity than disputes which, whatever the outcome, must inflict loss alike on victor and vanquished. No " goose " can be expected to lay " golden eggs " while it is being pulled by the head in one direction and by the legs in another. And " golden eggs " are sorely needed to-day!

PERSONAL

CHANGES AT TUNBRIDGE WELLS.

MR. C. F. CATT.

Mr. Catt, who retires at the end of this month, has devoted 46 years of his life to the service of the Tunbridge Wells Gas Company. He entered the office in 1885 as an Assistant to the late Mr. John Read, Secretary and General Manager, and on that gentleman's death in February, 1901, he was appointed Secretary.

Mr. Catt is a Fellow of the Chartered Institute of Secretaries, to which body he was elected in 1902. He is also a Director of the East Grinstead Gas and Water Company, being first elected in February, 1913. He is on the original Committee of the British Commercial Gas Association, representing the Southern District. He has been Auditor to the Tonbridge Gas Company since February, 1902, and is one of the original members of the Rotary Club.

For some time Mr. Catt has not been in the best of health, and everyone will hope that in his well-earned rest he will be fully restored.

MR. L. J. LANGFORD.

Mr. Langford, who has been Chief Engineer for the past fourteen years, has been appointed to the position of General Manager. He was born and educated at Bath, and obtained his professional training with the Bath Gas Company and the Corporation Gas Department of Langton, Stoke-on-Trent. In 1909 he was appointed Engineer and Manager of the Abertillery Urban District Gas Department, and held that position till 1915.

Mr. Langford comes of a "gas family," for his father was Engineer and General Manager of the Stoke-on-Trent Corporation Gas Department, and his brother, Mr. P. N. Langford, is Engineer and General Manager of the Coventry Corporation Gas Department. On the death of his father in 1915, Mr. Langford succeeded him, and in 1916, on the retirement of the late Mr. Andrew Dougall, the Engineer and General Manager of the Tunbridge Wells Gas Company, he was appointed Engineer. He was President of the Southern Association of Engineers and Managers in 1924, and is a member of the Council of the Institution of Gas Engineers.

MR. F. J. BRAMPTON.

Mr. Brampton entered the service of the Company in 1891, and has therefore completed 40 years. He has been promoted to the position of Secretary, thus succeeding Mr. Catt.

MR. F. G. WICKS.

Joining the staff of the Company in 1899, Mr. F. G. Wicks has completed 32 years, and in recognition of his valuable services he has been appointed Assistant Secretary.

Mr. FREDERICK R. MITCHELL, of Dundee, has been appointed Gas Manager at Tayport.

Mr. G. E. BANNER has resigned his position of Technical Assistant to the Smethwick Gas Department, consequent upon his having obtained an appointment with the Isle of Thanet Gas Company.

The Minister of Health has appointed Dr. A. C. MONKHOUSE, B.Sc., A.I.C., Ph.D., to be an Inspector under the Alkali, &c., Works Regulation Act, 1906. He has been assigned to the district with headquarters in Bristol.

OBITUARY

F. S. PHILLIPS.

The death occurred at Pendleton, on March 3, of Alderman FRANK SAMUEL PHILLIPS, at the age of 85. Alderman Phillips had devoted himself for nearly half-a-century to the service of Salford. He became a member of the Town Council in 1885 and had served continuously since. He was made an Alderman in 1898, and was the "Father" of the Council. He was Mayor of Salford in 1910-11; and in 1923, in recognition of his eminent services to the town and its municipal government for 38 years, the honorary freedom of the city was conferred upon him. The Council's resolution bestowing this signal honour referred to his civic career as "a conspicuous example of the public spirit so essential to the well-being of the town."

A member of the Gas Committee for 44 years, Alderman Phillips was appointed Deputy Chairman in 1890, and Chairman in 1897—a position he held to the last. He was one of the founders, in 1911, of the British Commercial Gas Association, and in 1916 of the National Gas Council of Great Britain and Ireland, and filled high offices in connection with these bodies. He was a member of the National Joint Industrial Council for the Gas Industry, which was set up in 1919. He was also on the Executive Committee of this Council, acknowledged to be the most successful of all the Whitley Councils in the country. For some years he was Chairman of the Manchester Regional Joint Industrial Gas Council for the north-western area. A few years ago he was also Chairman of a Committee of the Municipal Corporations Association for the promotion of Whitley Councils in connection with local authorities, and was in addition a member of the National Joint Industrial Council for Local Authorities (manual workers), non-trading services.

In many other departments of public work, says the "Manchester Guardian," Alderman Phillips took an active part, bringing to each of them a sound judgment, a lucid marshalling and exposition of the facts, and a strong conception of duty.

The death has taken place of Mr. ABNER CRADDOCK, Secretary to the Rugeley Gas Company, at the age of 69 years. Mr. Craddock had been Secretary of the Company since 1907.

The Newport (Monmouthshire) Gas Company has sustained a serious loss through the death of two of its senior Directors within the short period of one month. Sir A. GARROD THOMAS, M.D., D.L., LL.D., who had been a Director for nearly fourteen years, died on Jan. 30, and Lt.-Col. J. C. RENNIE BREWER, J.P., who joined the Board in 1909 and had been Deputy-Chairman for over ten years, on Feb. 26.

Forthcoming Engagements.

March 12.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Annual general meeting at the Grand Hotel, Birmingham, 2.30 p.m.

March 12.—MIDLAND JUNIOR GAS ASSOCIATION.—Visit to Messrs. Sperryn & Co., Moorsom Street Works, Birmingham, in the evening.

March 18.—BRITISH COMMERCIAL GAS ASSOCIATION.—Meeting of the General Committee, 28, Grosvenor Gardens, 2.30 p.m.

March 18.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Joint Meeting with Yorkshire Junior Gas Association at Sheffield. Visit to Messrs. Newton Chambers, Ltd. Paper by Mr. R. Halkett, Jnr., "Explanatory Remarks with Reference to a Supply of Coke Oven Gas."

March 19.—SOCIETY OF BRITISH GAS INDUSTRIES.—Council Meeting in the afternoon.

March 19.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Annual General Meeting at the Hotel Metropole, Northumberland Avenue, W.C., at 2.15 p.m.

March 20.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Paper by Mr. J. G. Clark on "Gas Lighting."

March 21.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Annual Social. Address by Mr. R. E. Gibson, Vice-President of the Institution of Gas Engineers.

March 21.—WALES AND MONMOUTHSHIRE JUNIOR GAS ASSOCIATION.—Visit to Tredegar. Paper by Mr. D. W. Davies, Engineer and Manager to the Tredegar Gas Undertaking.

March 24.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at 28, Grosvenor Gardens, S.W. 1.

March 26.—B.C.G.A. YORKSHIRE DISTRICT CONFERENCE at Halifax.—Alderman J. H. Waddington, J.P., presiding.

April 10.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Spring Meeting at Falkirk.

May 14 and 15.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring Meeting at Wisbech.

May 21.—WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION.—Meeting at Cardiff.

May 22.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual General Meeting in London, under the Presidency of the Right Hon. Lord Eustace Percy, M.P.

June 2-4.—INSTITUTION OF GAS ENGINEERS.—London Conference.

Oct. 27-28.—INSTITUTION OF GAS ENGINEERS.—Autumnal Research Meeting.

CORRESPONDENCE

Safety First at Night

SIR,—The fact that nearly twice as many street accidents to pedestrians occur after dark as in daylight forces one to the conclusion that bad street-lighting must be held responsible for the steadily increasing toll of life on the roads at night.

South London has set a notable example by adopting centrally-suspended high-pressure gas lamps; and although no official figures are available, yet it is known that there has been a decline in the number of accidents in districts thus illuminated.

At a Lewisham inquest a few days ago, a motorist explained that an accident in which a child was killed occurred at Loampit Hill. Drivers familiar with the district will know that it is at the top of the hill that the system of centrally-suspended high-pressure gas lamps begins, but where the accident occurred alternative electric lamps are placed at the sides of the road. He gave it as his opinion that there would have been no collision had the lighting at this spot, the foot of the hill, been better.

The effect of the " staggered " lamps is to make circles of light which leave the rest of the road comparatively dark. Centrally-suspended overhead high-pressure lamps are being installed in several of the South London Boroughs, and I would suggest that this effort to standardize street-lighting on modern scientific lines should be carefully watched by local authorities, who, after all, are morally responsible for the safety of citizens in the streets in their districts.

W. J. LIBERTY,
Late Lighting Superintendent to the City of London.

64, *Victoria Street, S.W.* 1,
March 4, 1931.

Gas Service

SIR,—As a wanderer looking for a home, I am temporarily compelled to live in boarding or apartment houses; and my experience of " Gas Service " has been a varied one. In my opinion there is urgent need on the part of gas undertakings for a fuller knowledge of conditions respecting gas apparatus which exist in the houses of many consumers. To one who has had long experience and still has a stake in the Industry, some of these conditions, in view of the present great push of electricity for all services, are very disturbing, as they might so easily be prevented with a proper system of inspection.

Bad " Gas Service " may undoubtedly in many cases be due to indifference and ignorance on the part of the consumer, but there is no doubt a large field where the gas undertaking can improve matters and increase business by the inspection of apparatus and the education of the householder in the proper use of gas.

There must be many people, potential consumers of gas, who are looking for a home and living temporarily in boarding or furnished houses, but who, unlike myself, have no special knowledge of " Gas Service," and will as the result of their experience exclude gas from their permanent abode. The person with no special knowledge of the advantages of gas is apt to put up with what he looks upon as only a temporary inconvenience, but it prejudices him against the use of gas for ever after.

I have found in bedrooms gas fires which are a disgrace to the gas undertaking. A few weeks back I had one of a type which I thought had been consigned to the scrap-heap years ago. The fuel—what there was of it, and there was very little left—consisted of asbestos fibre, from which it was practically impossible to obtain any heat or even cheerfulness. In the same house, the bathroom was fitted with a geyser, and its condition was such that for the safety of my wife and daughter I felt it necessary personally to superintend the preparation when they required to use the bath.

In another house, where gas is used for lighting, the owner is anxiously looking forward to the advent of electricity, which will be available very shortly, so that he can rid himself of the blackened ceiling trouble which is certainly very much in evidence, but in my opinion is principally due to cheap and unsuitable fittings. In this house the owner also favours electric radiators because gas fires are " so unhealthy and always smell." A geyser is also excluded because of the fatal accidents recorded in the newspapers.

I also find that a great deal of ignorance exists as to the type of kettle or cooking utensil suitable for use on a gas ring. In one house I was supplied with a hollow bottom kettle, for use on the ring of a gas fire, which acted almost like an extinguisher, smothering the flame and causing an obnoxious smell. I was able to prove, by raising the kettle and supporting it above the flame, that the smell disappeared; but it is usual in such cases, when making complaint, to be informed that the gas always smells.

I trust that these experiences are exceptional; but as they occurred in the territory of a well-managed and progressive gas undertaking, I am afraid such conditions exist where they are least expected, and are a danger to the future prosperity of the Industry. I admit that gas undertakings almost without exception give immediate and careful attention to such matters when brought to their notice, but my contention is that these deficiencies can be avoided by a proper system of inspection and a scheme of education in the " Advantages and Economy of Gas Service," which I believe would be welcomed in the majority of homes.

A RETIRED GAS ENGINEER.

March 8, 1931.

GAS SERVICE - - -

Discussed from the viewpoint of the Gas Salesman

Palace or Cottage Showrooms?

The question has been raised on several occasions lately as to whether the modern tendency in gas showrooms is not inclined towards the ultra-elaborate, in such a way as to overawe and rather scare away the humble consumer. The obvious answer surely is that the type and style of showroom must depend largely upon the district, and the class of customer with whom most of the business has to be done. In this sense, we think that careful thought is usually exercised by those who are responsible for the erection of gas showrooms and the arrangement of displays. That there are exceptions is evidenced by a letter which appeared in the " JOURNAL " recently, in which a correspondent, who disclaimed any connection with the gas industry, wrote as follows: " Perhaps I may be permitted to offer my impression of the advertising activities of the various gas companies, as displayed in their provincial showrooms. These showrooms appear to cater almost exclusively for what I term the " A " class of gas user—*i.e.*, the mistress of the house, who keeps her own cook, or the wife who has a daily cooking help, or the fastidious wife who is intelligent, keen, and experimental with her cooking. In no case have I observed a gas showroom where a humble everyday kitchen (complete with a properly mounted gas cooker, copper, sink, and dresser) has been installed, where the " B " type of gas user—*e.g.*, working women—can see and talk to a working woman utilizing gas to the best advantage. Bearing in mind that " B " users form a predominating numerical proportion of the gas companies' customers, some action seems necessary."

Office Cloakroom Equipment.

A point made recently by a woman writer in the " Gas Salesman " is that office cloakroom equipment may, in some parts, be quite worth a special sales campaign. The young people at work in offices are all potential wives and husbands, and consequently home builders. It is as well to give them experience of gas-heated water service before they run homes of their own. " Many of the public," she says, " are still ignorant of apparatus other than geysers for supplying gas-heated hot water. If you want to prove

this statement, ask any of your friends how water can be heated by gas. I have done so many times, and the answer comes pat, 'A geyser, of course.' A girl I know told me that for the past seven years in her office they had only a cold water service to the two washhand basins in their cloakroom. This year an automatic service to both basins had been supplied. The girls thought the installation marvellous. It was, in fact, a nine days' wonder. I was taken to see it as one of the sights of the building."

The Salesman and the Laboratory.

Co-operation between salesman and laboratory was the subject of an interesting address to the London District Salesmen's Circle last week by Mr. C. A. Masterman, of the Gas Light and Coke Company. Naturally much of his paper dealt with the activities of Watson House, though he emphasized more than once that it is merely representative of a number of laboratories throughout the country working on somewhat similar lines, and was taken as an example mainly owing to their mutual familiarity with it.

The essence of the paper was neatly summed up in its concluding sentences: "While the salesman fires the ammunition, the laboratory is helping to improve its quality and control its supply. There is no sign of any lack of new developments on our side of the industry. If these are conscientiously incubated in the laboratories and confidently taken to market by enthusiastic salesmen, we shall be able to welcome rather than fear the stimulus of increasing competition."

Patience and Confidence.

With regard to the respective functions of the two parties to this combination, Mr. Masterman considers that the salesman must recognize several obligations. A frequent cause of misunderstanding between the laboratory and the outside world is that the latter cannot always realize why delays should occur, especially if the task presented to the laboratory is a simple one. It is not always realized that, though the laboratory could often give a personal opinion with little delay, such an opinion could not carry the guarantee of reliability for which the laboratory, as such, partly exists. Laboratory results, to be of value, must be reliable, and for this to be the case they must be submitted to check and confirmation before use is made of them. From this cause springs not only delay but a hesitation to state results in blunt and simple language. Statements from a laboratory tend to be qualified and hedged about with phrases which, however justified they may be scientifically, are often both unintelligible and infuriating to the impatient inquirer.

Another necessity is that the salesmen must learn to place confidence in the work of the laboratory. It is, Mr. Masterman explained, foolish for salesmen to ignore as wholly unproven any innovation just because they themselves have not successfully tried it out. Co-operation at a distance requires also to be supported by more direct contact, which may be obtained by personal touch and by exchange of information. This does not imply that the blind reference of all difficulties or complaints by the salesmen to the laboratory by itself constitutes the salesman's share in the exchange. Information as to success may be as fruitful in such ideas as is information of failure, whereas in general, according to Mr. Masterman, it is only the latter in which the laboratory is allowed to share.

The Gas Industry and Medical Science.

An interesting feature of the address was a display of various apparatus which have had their origin at Watson House, by means of which the speaker was able to show various improvements which had been carried out on them as a result of laboratory research. Among the appliances was a unit for producing artificial sunlight by gas, and a valuable contribution on this subject was made to the subsequent discussion by Prof. Sir Leonard Hill, who quite definitely expressed the opinion that the gas industry can now go to the medical profession and the public and offer a heater which will alleviate such conditions as obtain in chronic rheumatism.

Sir Leonard explained how, when working some years ago with electrical apparatus for the treatment and prevention of disease by ultra-violet rays, he had wondered why the gas industry was not taking up the utilization of visible infra-red rays which are known to possess such valuable properties. He had consulted with Mr. Clark, and the result had been the production of the appliances shown to the meeting. What he had suggested was a ring of incandescent gas burners on an adjustable stand. The apparatus gives a sunny effect which is exceedingly pleasant. They had studied the electrical apparatus and measured exactly what surface heat they gave, and then they built up a gas heater giving exactly the same temperature as the electrical instrument. The instrument is, in fact, exactly equivalent to the electrical one. He had also been trying out the Garba bowl heater with a strong mantle giving a red light, and Messrs. Radiation Limited had provided a bowl heater with a "Beam" clay mantle which would not break. Such instruments as these can be provided at a very reasonable price. The main thing is to get a source of radiant heat which will warm up the patient. The public could use the apparatus themselves without danger.

As far as these appliances are concerned, they should never talk about cure. This should be left to the quacks. But relief can be obtained in cases of chronic rheumatism by this method of radiation. Sir Leonard remarked that he had taken in a number of patients who had been having infra-red and ultra-violet ray treatment for some time. He had warmed them up for as long as he could spare the time, and they had become remarkably better and said that they had experienced more benefit from his treatment than from the electrical treatment they had had before.

The National Laboratory Idea.

The advantages which would accrue from a central laboratory for the gas industry were referred to later in the discussion by Mr. J. G. Clark, Manager of the Research and Training Section, Watson House. The financial help which the National Laboratory, for instance, receives in America enables central research to be carried out on rather different lines to what can be done by any individual gas undertaking. Mr. Clark sees scope for co-operation in this direction in this country, and looks forward to the day when we shall have our national institution.

Later Mr. A. Tennant (East Surrey) stressed the need for some kind of central organization, and incidentally paid tribute to the service which the larger companies are rendering to some of the smaller undertakings. The fact that certain makers specifically claim that their apparatus has been tested and approved by the Gas Light and Coke Company puts some of them in a difficult position. They are glad to rely on the Company's test, but how are they to verify the maker's claim? Here, in Mr. Tennant's view, is a clear case for an official "National Stamp." The plea was supported by Mr. W. L. Westbrook (North Middlesex), who claimed that a national mark is the public's due as well. Certain appliances are indiscriminately put on the market, and, if gas undertakings will not accept them, they are sold from ironmongers' shops.

In his reply to the discussion, Mr. Masterman pointed out that the central laboratory idea is not so simple as it might appear. The regulations of the American institution, for example, which deal with the performance of appliances go into great detail in regard to the construction, certification, and so on, and, to be effective, such a central authority would have to have a large measure of control over output of appliances. Like other speakers, Mr. Masterman sincerely hoped it would come. Meanwhile, he emphasized again that his Company have no authority to approve appliances for the whole industry. They are always pleased, however, to impart to others, in confidence, the results of their tests.

[A full report of the paper and discussion will appear in the March "Gas Salesman."]

Antiques.

There is much excellent material in the February "Flame," the Bulletin of the Leicester Corporation Gas Department, calculated to instruct entertainingly the public for whom it is intended. In lighter vein is the following: ANTIQUE.—We thank you for submitting for our inspection the collection of old coinage which was found intact in your slot meter. As no doubt you wish us to value them for you, we do so as follows: 1 time check, date about '0012 B.B.C. (before Broadcasting), 1 Roman tram check (service suspended so of no value), 1 Fiji Island charm (now out of fashion), and also 1 Eskimo bread check. As we cannot find any use for these tokens of good faith, kindly call at these offices with fourpence and your family heirlooms will be returned unto thee.

Economical Housekeeping.

A common grievance of the ordinary housewife is that cookery books in general are inclined to instruct her two or three times per page to "throw in a dozen eggs." "Simple Dishes for Every Day," a new production of the B.C.G.A., will be welcome because it deals with homely dishes made in a simple straightforward way. The gas element is introduced very neatly into the general sections on economy in the kitchen, methods of cooking, and hints for the busy housewife, and sincerity is achieved by the absence of any implication that a rice pudding cannot be baked except by gas.

THE NEWS OF THE WEEK

After a Comparative Analysis of the relative claims of gas and electricity for public street lighting the Sowerby Bridge Urban District Council have decided to retain the gas service.

To Simplify Inter-Company Working a scheme for the amalgamation of Arthur Duckham & Co. (1920), Ltd., with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., is under consideration, and will be submitted to the shareholders shortly.

A Graduated Scale of Charges is expected to be in operation at St. Austell very shortly. This Company have increased their output by 335 p.ct. during the last thirty years, and a further increase was reported at the recent annual meeting. Many new consumers were registered.

The Second Annual Dinner of the employees of the Newton Abbot Gas Company, held at Phillips' Restaurant on Feb. 21, was well attended and proved very enjoyable and successful. The chair was occupied by Mr. F. J. Prowse, supported by Mr. R. L. Back, the Vice-Chairman.

A Special Spring Cleaning Display may be seen at present in the showroom window of the Truro Gas Company. Various coal-consuming and dirt-producing appliances are scattered about the lawn of a model house, while round the sides of the window are the usual gas substitutes such as fires, cookers, gas irons, gas boilers, &c. "When you sweep out the dust, sweep out the apparatus that makes dust" is the moral on a large showcard.

Two Deaths from gas poisoning occurred on March 5 at the Southall Works of the Gas Light and Coke Company. They were Edwin Couling and A. W. Lippard who were working in a valve chamber when they were overcome. Artificial respiration was tried when they were brought to the surface, but they were both dead. Two other men were rescued. At the inquest, George Harris, foreman at the works, said he told the men that they were not to go into the chamber unless he was present, and that his instructions were disobeyed.

Newcastle Company's Year Book.

A Record of Achievement.

The 1931 edition of the Newcastle-upon-Tyne and Gateshead Gas Company's Year Book forms a fine record of achievement of the Gas Industry in general and of the Newcastle Company in particular.

Following the Directors' report and statement of accounts for the past year and the record of the proceedings at the annual general meeting (which will be found on another page of this issue), some general figures are given showing the soundness of the Industry from a monetary viewpoint. Some further figures bear eloquent testimony to the unbroken progress of gas in Newcastle for nearly a century. In 1838 the amount of gas sold in the area was 17 million c.ft. to 2200 consumers, served by 25 miles of mains. To-day the sales of gas exceed five thousand million c.ft. to 193,848 consumers; while the mileage of mains is 1232.

An illustrated centre piece to the booklet shows the wonderful difference that gas has made in the daily life of the community. "Gas comfort follows you round the clock" is an apt slogan. There is no end to the use of gas, it is stated; 60,000 articles used in daily life require gas at some stage or another in their manufacture.

Further articles discuss gas fires and gas as the agent for the domestic water heating load. The industrial utilization of gas and the prospect for the future receives attention. The importance of heat in industry, it is stated, is not generally realized. The lay mind pictures vast power plants, yet overlooks the fact that heat has played an enormous part long before power becomes really necessary. Modern gas lighting is dealt with, a photograph showing the excellent illumination of a section of Gateshead. Smokeless gas coke and bye-product recovery are mentioned, and in regard to the former it is remarked that improvements in the Company's methods of grading have increased the advantages of this fuel both for domestic and for industrial purposes.

Other matters receiving attention in this excellent brochure are examples of the Company's poster advertising, the travelling showroom, their maintenance service, and the work of the Company in the direction of staff welfare.

Electricity Chairman and Ministerial Propaganda.

A very fair statement in regard to the Minister of Transport's attitude in regard to the boosting of electricity was made by Mr. George Balfour, J.P., M.P., Chairman of the Midland Counties Electric Supply Company, Ltd., at the Eighteenth Ordinary General Meeting held in London on March 2.

With reference to the observations of Dr. Carpenter, of the South Metropolitan Gas Company, and of Sir David Milne-Watson, of the Gas Light and Coke Company, at their recent meetings, as to the activities of a Minister of the Crown engaging in propaganda on behalf of the electricity supply industry, said Mr. Balfour, he felt that they had just cause for complaint when the weight of the Minister of Transport or his Department was thrown in the scale in favour of one industry against another. He (the Chairman) could imagine the outcry of the electricity supply industry if the position was reversed, and the Gas Industry was fed with State aid and propaganda in competition with the electricity supply industry. The electricity supply industry asked for nothing more than a fair field and no favour. Both would function more effectively in the interest of the consumer and the country at large, stimulated only by the rival claims of these competitive industries, but unhampered by artificial aids to prosperity.

Lectures on Coke Ovens and Bye-Products.

As mentioned in the "JOURNAL," last October and November a course of six semi-popular lectures on coke oven and bye-product work was given at Rotherham by Mr. G. J. Greenfield, and at Barnsley by Mr. A. C. Middleton; and it is satisfactory to know that the idea is being adopted throughout the West Riding of Yorkshire.

Mr. Greenfield has just completed a similar course of lectures at the Castleford, Normanton, and District Mining and Technical Institute. This centre serves Normanton and Castleford and men attending from the neighbouring coke oven plants, gas-works, and chemical works, the total number of the students being 61. This, of course, is a much smaller centre for coke oven workers than Rotherham.

A similar course of lectures has now been commenced at Wakefield by Mr. A. Wilkinson, Chemist to the Whitwood Chemical Company. This is a smaller centre still, and the number of students enrolled there is 28.

Gasholder Explosion at Stretford.

Damage to Other Holder.

No. 1 Gasholder (500,000 c.ft. capacity) at the works of the Stretford and District Gas Board was emptied on the night of Tuesday-Wednesday, March 3-4. On the morning of Wednesday the release cock in the centre of the crown was opened to release the gas, the manhole cover in the crown over the inlet and outlet pipes was removed, and the top flanges of the inlet and outlet of the standpipes in the gasholder well were removed. The inlet and outlet pipes were then sealed with water, and steaming was commenced to remove the naphthalene deposit. By Friday both pipes were cleared, and the boiling water was bailed out with buckets.

After inspection of the standpipes inside the holder with an electric lamp, the manhole cover was replaced, and the

THE NEWS—*continued.*

flange was replaced on the outlet pipe. The flange was not, however, replaced on the inlet, but this was left open as the holder was not required immediately. It was decided to finish the work on Saturday, March 7. The gasholder pipe well was covered over by boards to prevent anything falling into the open inlet pipe.

An explosion occurred at about 11.25 p.m. on Friday, March 6, the holder, of course, being on the rest blocks; and so far as can be ascertained, the valves had not been interfered with. Pieces of sheeting from the crown of No. 1 Holder pierced the crown of No. 2 Holder, which is exactly similar and adjoins; and the gas in this became ignited. It contained approximately 60,000 c.ft., the top lift only being out of the tank, the other two lifts being at rest.

No. 2 Holder burnt out, and the damage is confined to the crown; fortunately, No. 3 Holder adjoining was not damaged, although portions of the plate of No. 1 Holder struck the sides.

The supply of gas to the district has not been in any way interfered with, and there was no injury to persons or property on the gas-works or elsewhere. The re-sheeting of the crown of No. 2 Holder is well in hand, and it is anticipated that this holder will again be in commission in about a week.

The cause of the explosion has not yet been ascertained. There is a possibility that hot coke sparks or breeze from the telpher skip may have been blown over in the strong N.E. gale that was blowing, and caused oil to fire in the holder cup, although this was not observed prior to the explosion.

The Board have considered the accident, and are satisfied that there has been no culpable negligence on the part of any official or workman in connection with the explosion.

Nottingham Gas Frauds.

A Tragic Sequel.

Within three days of the conclusion of the trial at Nottingham Assizes of the nine defendants who were convicted of conspiring for participation in frauds or of false pretences in connection with the Municipal Gas Undertaking, involving an estimated loss to the ratepayers, so far as has been at present ascertained, of approximately £100,000, there was a tragic sequel. Frank Mullis, aged 68, proprietor of a soap and candle making business, died in Lincoln gaol. Mullis, who had been in the prison infirmary awaiting his trial, had pleaded guilty to a charge of obtaining by false pretences £3256, and when brought into Court to receive sentence with the others, he had to be carried on a stretcher, which was deposited upon the table in front of Counsel, where he lay evidently in great physical pain.

In passing sentence upon him, the Judge said that Mullis was obviously in a miserable state of health, but he (the Judge) could not make any difference upon that account. The prisoner would be well looked after.

At the conclusion of the trial on Feb. 28 Mullis was again removed to Lincoln prison, and expired there in hospital on March 2.

After he had been sentenced he became unconscious. The testimony of the Prison Surgeon (Lieut.-Col. F. S. Lambert) showed that the greatest care was exercised in sending Mullis to Nottingham. Upon being again brought back he was evidently in an extremely depressed condition. He was suffering from an enlarged and fatty heart, the cause of death being the shock occasioned by the sentence, with resultant heart failure aggravated by a serious attack of gout.

The Jury returned a verdict in accordance with the medical testimony.

The Year's Working of the Belfast Gas Department.

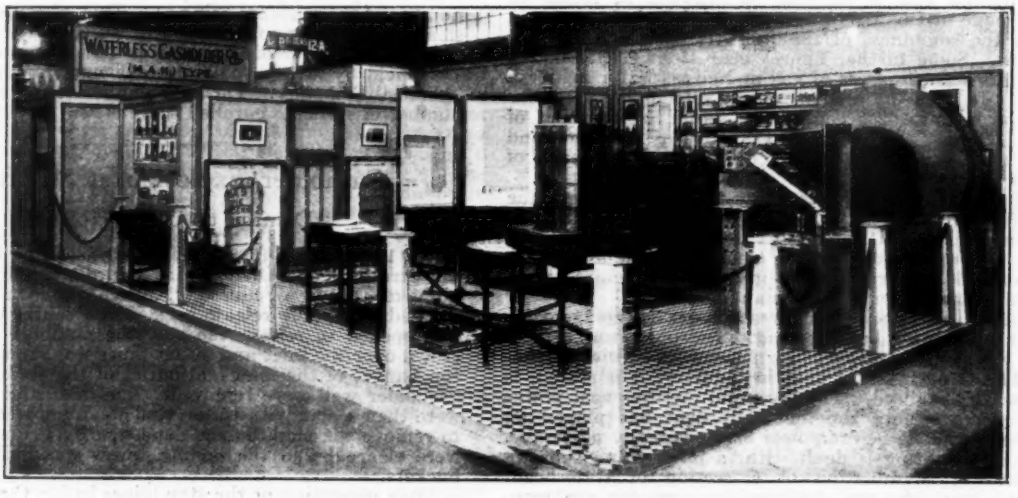
The auditor's report on the accounts of the Belfast Gas Undertaking for the year ended March 31, 1930, showed that the result of the year's trading was a gross profit of £147,206 on the manufacture and sale of gas and residuals as compared with a profit of £166,104 in the previous year. The decrease in profit was due to a reduction in the price of gas supplied for industrial lighting, and to a reduction in the receipts from coke, tar, and other chemical products. The profit in the stoves department was shown at £1534 as compared with £2632 in the previous year. The balance at the close of the year was £32,702, which was carried forward to the credit of the appropriation account. The capital expenditure during the year amounted to £38,326, bringing the capital outlay on the undertaking, less amounts written off for depreciation and plant scrapped, up to £1,881,017 at the close of the year. Capital expenditure in excess of authorized borrowing powers to an amount of £27,958 was incurred, which was recouped out of revenue in the succeeding year. The capital indebtedness at the close of the year was £952,105, against which there was a credit in the sinking fund of £125,431, and an unexpended balance in the capital account of £82,449.

The Shireoaks Colliery Co., Ltd.

Mr. C. A. Longbottom, J.P., presiding at the one hundred and twenty-second Ordinary General Meeting of the Shareholders, at Shireoaks Colliery, referred to the Coal Mines Act and said it was as yet early days for even those in close touch with the industry to prophesy as to its effective working. He thought some scheme that would close uneconomic and redundant mines would be the right step towards a way out of the present deplorable conditions.

It was to be hoped that the Act was in every way an honest endeavour to arrive at some sort of cohesion and prevent the present cut-throat competition that threatens to annihilate this great basic industry. Coal prices were unprofitable because, as compared with pre-war times, labour and all mining costs had advanced much more than the selling price.

This country was now exporting 44 million tons less than in 1913, and our reduced exports and unprofitable prices were the outcome of increased and violent competition, excessive productive capacity abroad, and our failure to compete with it.



THE WATERLESS GASHOLDER COMPANY'S ("M.A.N." TYPE) EXHIBIT AT THE BRITISH INDUSTRIES FAIR.

NOTES ON NEW BOOKS

THE MATHEMATICS OF FUEL TECHNOLOGY.*

In this very useful book, many aspects of fuel utilization in furnaces and in boiler installations are considered, and the formulæ required in the calculation of the performance of plants and in design are developed. The treatment, throughout, is very up-to-date, and the book may be confidently recommended to those interested in this branch of fuel technology.

Among subjects dealt with may be mentioned the composition and properties of fuels; the combustion of liquid, solid, and gaseous fuels with the theoretical amount of air, with excess air, with insufficient air, and with air enriched with oxygen; the calculation of the volume of combustion gas from the composition of the fuel and the carbon dioxide content of the combustion gas; the effects of preheat; heat losses due to incomplete combustion, and to radiation and convection; stack losses; heat transfer by conduction, convection, and radiation; radiation from flames; heat transfer in boiler installations; flow of gases; chimney draught.

A very valuable feature is the use of innumerable graphical methods to simplify calculations. In this connection, treatment is often facilitated by the use of generalizations which, though approximate, are sufficiently accurate to enable short cuts in the calculations to be made. An appendix contains tables of the properties and specific heat of gases, a wide selection of conversion factors, and a Centigrade-Fahrenheit conversion table.

Rosin's *It*-Diagram is fully considered, and its use is explained.

The treatment throughout is very lucid and there is but little to which exception may be taken. In this connection it may be mentioned that the effect of gaseous dissociation on flame temperature is not treated as rigidly as it might have been, and the method put forward for calculating the dissociation of the carbon dioxide and water vapour is but approximate. Though there may be some justification for not discussing this question vigorously in view of the diversity of the published data on the equilibrium constants involved, it is nevertheless to be regretted that an accurate method of making use of these data was not described.

For the calculation of the calorific value of solid fuels from the proximate composition, the author puts forward a recent formula of his own. This, while more accurate than Goutal's formula, is, nevertheless, also unreliable. It seems not to be generally realized that the nature of the volatile matter is as important as the amount of volatile matter—or, in other words, that coals of equal volatile content but differing in coking quality have different calorific values. Where a reliable indication of the calorific value is required in absence of a direct determination, a knowledge of both the proximate and the ultimate composition is necessary.

* "Feuerungstechnishes Rechnen," by W. Gumz. Vol. 12 of the series Monographien zur Feuerungstechnik, Leipzig, 1931, Otto Spamer. Pp. 133. Price RM.8 unbound, RM.9 bound.

WATER ENGINEERING IN 1930.*

After the exceedingly difficult period through which water engineers passed in 1929, the year 1930 may be considered a pleasant one. The industrial depression brought about a decreased demand for water, and opportunity was given for work extensions which proceeded at a rapid pace. This comment appears in the "Water Engineers' Handbook and Directory, 1931," which has just been published. It is stated that legislation was of outstanding importance during the year, the Land Drainage Act and the Reservoirs (Safety Provisions) Act both having been placed on the Statute Book. The publication goes on to review the developments of the year.

Further sections deal with water by-laws and regulations, followed by the usual valuable technical data, including general remarks on pumping machinery, giving tables of running costs and efficiency, purification of water, and hydraulic data and formulæ. The final section of the publication is devoted to the directory, including an alphabetical list of water engineers and the authorities to which they are attached; a directory of water undertakings in Great Britain and Ireland, giving names of the chief officers, area supplied, source of supply, character of water, treatment, distribution, and developments in progress or in prospect; waterworks statistics, showing populations and areas served, consumptions, storage capacities, lengths of mains, and rateable values; while in conclusion there is an overseas section, giving particulars of water supplies in the dominions. Altogether a very comprehensive volume, which no water engineer can afford to be without.

* "The Water Engineers' Handbook and Directory, 1930." Published by "Water and Water Engineering" (Proprietors: The Colliery Guardian Company, Ltd.), 30-31, Furnival Street, E.C. 4. Price 8s. 6d. (postage 6d.).

Institution of Chemical Engineers' Dinner

The Annual Dinner of the Institution of Chemical Engineers, which took place at the Hotel Victoria, London, last Friday, provided a thoroughly enjoyable evening for the 250 or so members, ladies, and guests who were present, under the Chairmanship of Mr. J. Arthur Reavell (the President). The speeches were bright, and the musical programme (for which the Kensington Singers were responsible) was excellent.

"THE INSTITUTION."

The toast of "The Institution of Chemical Engineers" was proposed by the Right Hon. Lord RAYLEIGH, F.R.S., who said that the formation of the Institution could be regarded as marking a transitional epoch in the profession which it represented. It was instructive to consider the conditions which prevailed before the establishment of the Institution and those which obtained at the present time. Reading the life of the late Sir Henry Bessemer, one could truly say that Bessemer was a chemical engineer, but the great difference between Bessemer and the chemical engineers of to-day was that Bessemer was essentially an individualist. He worked entirely on his own initiative, whereas the whole tendency to-day was co-operative work, without which the best results could not be expected. In this connection, and as instancing the type of man who belonged to the later epoch, there was the late Lord Moulton. He also was a chemical engineer, but he was entirely occupied with the organization of chemical engineering, as was demonstrated by his great services during the war in connection with the provision of the huge quantities of high explosives that were necessary. The presence of Dr. Lander of the Fuel Research Station was another reminder of the present position with regard to co-operation in matters relating to chemical engineering. A great deal had been heard of low-temperature carbonization, and the work done in that direction at the Fuel Research Station served to emphasize the genius of the late Lord Moulton in not only knowing what to do, but also what to avoid. A great deal had been heard from certain politicians with regard to the application of low-temperature carbonization on the large scale, but the work done at Greenwich had indicated that there was a great difference between working such processes on the small scale and putting them into operation on a commercial scale. An instance of the foresight of the late Lord Moulton relating to a matter of this kind was when it was suggested that the Haber process should be adopted during the war for supplementing the nitrogen supplies of the country. Lord Moulton, with his great knowledge and experience, was able to judge and to decide that it was not a practical thing in the limited time available to get that process going in a manner which would enable effective use to be made of it for helping us against our enemies. The picture he was trying to draw from all this, said Lord Rayleigh, was that the work of the chemical engineer to-day, due largely to the work of the Institution of Chemical Engineers, was much more organized, much more varied, much more exacting, and required far more knowledge than was the case in the early days. It might be that a little of the romance of industry had gone out as commercial conditions had come in, and he had often reflected upon what would have been the position of some of the early workers if they had had to pass examinations such as those now set by the Institution of Chemical Engineers. As a matter of fact, he had often wondered why certain questions were put in such examinations, and at times had been tempted to suspect that the examiners themselves did not know the answers, but hoped, by setting the questions to students,

THE NEWS—continued.

they might possibly get some information themselves. [Laughter.] He felt that the younger generation must be cast in a more heroic mould than the older generation, in having to face conundrums such as often were set in these examinations.

In the course of his response, the PRESIDENT referred to some of the distinguished guests present—making special mention of Baron Gian Alberto Blanc, who had, on the previous day, at the meeting of the Institution, described one of Italy's new chemical developments. Incidentally, he mentioned that just as this country had its Department of Scientific and Industrial Research, so Italy had hers, of which Signor Marconi was President and Baron Blanc Vice-President. Speaking of the Institution, the President said the membership was increasing in a satisfactory manner, and had continued to increase in a regular ratio since the Institution was formed. He alluded to the work done by the Institution along educational lines, both in connection with the Institution examinations and in regard to university work. There were some, said the President, who felt there was a difficulty in getting the universities to arrange a suitable educational course for students who wished to become chemical engineers. It seemed to him that it was much more difficult to educate the educational authorities than to educate the students.

The next toast—"Economy and Progress"—was submitted by Sir ERNEST BENN, who dealt in a striking manner with the need for the economy campaign now being waged throughout the country; and responses were by Brigadier-General Sir HAROLD HARTLEY, C.B.E., M.C., F.R.S., and Dr. W. R. ORMANDY. Dealing with the second part of the toast, Dr. Ormandy remarked that, looking round, one saw ample evidence of progress. Science was helping the progress of the world in a thousand ways. It might be asked why it was that science had been able to do so much in increasing the amenities of life, and yet had been able to do so little for Government, and the answer was that Government was carried on, not by reason, but by sentiment—not by intellect, but by emotions.

The final toast was that of "The President," which was submitted by Mr. W. A. S. CALDER (President-Elect) and enthusiastically honoured. In his acknowledgment, Mr. REAVELL referred to the invaluable help he had received from Prof. J. W. Hinchley (the Hon. Secretary), Mr. F. A. Greene (the Hon. Treasurer), and Mr. C. J. T. Mackie (the Assistant Secretary).

Manchester Regional Joint Industrial Council for the Gas Industry

The Twelfth Annual Report of the Manchester Regional Joint Industrial Council for the Gas Industry was submitted, and approved, at the Annual Meeting of the Council held at the Grosvenor Hotel, Chester, on March 3. The members of the Council had previously assembled at the Offices of the Runcorn Gas Company, where a meeting of the Executive Committee took place, visits being subsequently paid to the Showrooms and Workshops of the Company, as well as to their Gas-Works.

During the course of the proceedings the members of the Council were entertained at luncheon by the Directors of the Runcorn Gas Company. Mr. G. Mason Frith, of the Runcorn Gas Company, presided.

There was a general expression of deep regret at the great loss sustained by the Council in the decease of its Chairman, Alderman F. S. Phillips, of Salford, and there were numerous references to the good work he had done on behalf of the Gas Industry generally.

Sir THOMAS ROWBOTHAM, Chairman of the Stockport Gas Committee, proposed the toast of "The Manchester Regional Joint Industrial Gas Council." Referring to the death of Alderman F. S. Phillips, he mentioned that that gentleman had been Chairman of the Council for the twelve years of its existence, and that he was typical of the Englishman who never spared himself in rendering unselfish service to his colleagues and personal friends, as well as to the industry with which he was connected. It was a remarkable tribute to his memory that during the whole term of his office not a single question had had to be referred for settlement to the National Council in London. Whitley Councils had been the means of fostering good fellowship and sympathetic contact between both employers and employees.

Sir JOHN FROST (Chester) supported the toast. He, also, was definitely of opinion that there was no difference of opinion which could arise, either between nations, industries, or private persons, which could not be settled amicably by conference and by mutual confidence in each other. Whitley Councils were the appropriate media through which that confidence could be maintained.

THE INFLUENCE OF THE WORKMAN.

Mr. A. BASNETT (Liverpool Gas Workers' Representative), in responding to the toast, said that, during a considerable period of its history, the Gas Industry had been a monopoly. Of recent years it had received somewhat of a shock in the form of an electric spark. Personally, he believed there was ample room for both the Gas Industry and the electricity industry, but that it behoved the former to adopt the most progressive policy it could for the purpose of fulfilling the requirements of the general public. That necessity was now recognized not only by the captains of the Industry, but also by their humblest workmen. It was fairly typical of the British gasworker that he did not very much concern himself with what time he clocked on and what time he clocked off. His outlook was the result of a broader basis of understanding of industrial needs, and he really did desire to further to the best of his ability the interests of the concern with which he was connected. There had been many instances where the humblest workman had not only insisted upon his own family using smokeless fuel, but also had succeeded in persuading the families of his relatives, to do so. He realized that smokeless fuel would tend to make their cities healthier and cleaner and the lives of the people happier.

COMPETITION FROM OIL.

Mr. C. E. ROSS (Manchester Gas Workers' Representative) also responded to the toast. He said that Lancashire difficulties need not be settled in London—Lancashire could carry its own weight. Personally, he was of opinion that what was troubling the Gas Industry at the present time was not so much the electric spark, but the oil spark, which opened up an entirely different aspect of the position. His own view was that the Regional Council did not meet with sufficient frequency; there had only been two meetings held during the previous year. As he conceived it, there was a possible danger of both sides of the Council becoming too complacent and too satisfied with the existing state of affairs. More frequent conference should be possible for the purpose of considering new methods, and possibly better methods, of making progress on both sides of the industry.

UNFAIR BOOSTING OF ELECTRICITY.

Councillor J. WILLIAMS, J.P. (Manchester), proposed the toast of "The Gas Industry." He said that he had been associated with the Council from its inception. As a matter of fact, he gave evidence before Mr. Whitley respecting the industrialist point of view in regard to such Councils. Nowadays a great number of gas plants were owned by local authorities, and, therefore, by the general public, among which necessarily were included the gasworkers themselves. Reviewing the general conditions which had prevailed in the Industry throughout the past year, Mr. Williams stated that there had certainly been progress, but not so much as might have been reasonably expected. There were numerous reasons to account for this deficiency, one of which was the unexampled trade depression which had prevailed. The Gas Industry was, however, suffering from other handicaps which were also very apparent, and many of which were unnecessary. Some of those handicaps could almost be removed by a stroke of the pen on the part of the people responsible for the legislation of the country. The Industry suffered from handicaps which were nearly a century old. The age was a progressive one, and the time had arrived for the elimination of any encumbrance which cramped industry. Apart from this side of the question, the actions of some of their Ministers were decidedly unfair. Only a few weeks ago the Minister of Transport, while on a visit to Manchester, made statements in the interests of a great competitor of the Gas Industry—electricity—which could not be otherwise than grievously disadvantageous to gas. Of course, electricity was not the only competitor. Oil had been mentioned, but there was also another very serious factor in regard to the Imperial Chemical Combine. The bye-products of the Gas Industry had now fallen in price, and it was sufficient to make one wonder when this type of competition would cease.

The close organization which had been brought about since the war had bred a common interest, and there was scarcely a man from the top of the Industry right down to the bottom who did not share in the wish for the advancement of the general welfare, and felt keen resentment at the treatment meted out. As an illustration he would read a resolution typical of many that he had received from the members of his organization, the National Union of Municipal and General Workers. Perhaps it would make them all more determined in their insistence that the Government of the day should repeal the limitations which had operated from so far back as 1847:

Resolved:

(*a*) That an urgent appeal be made to the representatives of the Gas Industry now sitting in the House of Commons

for immediate action to be taken with a view to removing the unfair limitations and restrictive fetters of the 1847 and 1871 Gas Acts.

(*b*) That a protest be recorded against the attitude adopted by the Minister of Transport with regard to State subsidized electricity to the disadvantage of the Gas Industry, which is self-established and is endeavouring to remain self-supporting.

In brief, the Gas Industry's feeling was summed up in the old but very true slogan: "A fair field and no favour."

Mr. S. TAGG (Engineer and Manager, Preston Gas Company), in responding to the toast, said that Mr. Williams had very rightly made a proper demand for the equitable treatment of the Industry. He hoped that every effort would be made by the trades unions to resist unfair competition between the two rival sources of energy.

Sir WILLIAM KAY (Manchester) proposed the toast of "The Runcorn Gas Company," which, he said, was established 94 years ago, and had been controlled by Mr. Frith and his family for the past 68 years.

Mr. G. MASON FRITH, in response, said he had been very much struck by the amount of good work done by Whitley Councils. He was not a believer in settling everything in London, and he did not think that all the wise men of the country were located in that particular centre. This was why he liked to keep as near as possible to the individual workers whenever there was a question of settling disputes, because the men both on the employers' side and on the employees' side knew what they were talking about, and knew the peculiarity of their particular job. In his opinion, the Gas Industry was in a very much stronger position at the present time than it had ever been before. The fact was that the output of gas throughout the country had been increased, despite the subsidized Government support of another industry. The day might come yet when electricians would be sorry that they had ever received a Government subsidy. They were undertaking supplies to-day which no private individual or corporation would ever dream of undertaking except under compulsion.

Mr. C. S. IMISON (Runcorn Gas Company) also responded to the toast. In doing so, he expressed the view that it would be useless to complain of competition through the production of synthetic sulphate of ammonia. Competition must inevitably arise if there were cheaper and more efficient methods of synthesis of certain products, which, after all, had only been by-products of the Gas Industry. He thought the use of the word "sides" in regard to Whitley Councils and Works Councils should be deprecated. There were no sides on a Board of Directors—they were all partners of the one concern. The same ideal should prevail in the case of industrial organizations established for the promotion of the general welfare.

The proceedings closed with the passing of a vote of thanks to Mr. G. Mason Frith for presiding.

OFFICIALS FOR THE COMING YEAR.

The following is a list of the representatives and officials of the Regional Council for the current year, with one vacancy in regard to the employers' representatives owing to the death of Alderman F. S. Phillips, J.P.

Chairman . . . . Mr. A. Basnett.

Vice-Chairman . . . Mr. R. E. Gibson (Liverpool).

Employers' Representatives.		*Employees' Representatives.*
Mr. R. H. S. Williams	Altrincham	National Union of General and Municipal Workers—
Mr. G. P. Mitchell .	Blackburn	Mr. A. Cleary
Mr. W. J. Smith . .	Bolton	Mr. T. Swan
Mr. J. H. Clegg . .	Burnley	Mr. T. Hartle
Mr. G. Dixon . . .	Lancaster	Councillor W. Hughes
Mr. R. W. Gibson. .	Liverpool	Mr. S. Lowry
Alderman Sir Wm. Kay, J.P.	Manchester	Mr. T. Prince
Mr. E. Parry . . .	Oldham	Councillor J. Williams, J.P.
Mr. S. Tagg, J.P. . .	Preston	Transport and General Workers' Union—
Mr. G. S. Frith . .	Runcorn	Mr. J. Blades
Col. W. M. Carr . .	Stretford	Mr. W. Watson
		National Amalgamated Union of Enginemen, Firemen, Mechanics, &c.—
		Mr. C. E. Ross
		Mr. W. H. Holding

Executive Committee.

Employers' Representatives.	*Employees' Representatives.*
Mr. R. E. Gibson	Mr. C. E. Ross
Mr. E. Parry	Councillor J. Williams, J.P.
Mr. W. J. Smith	Mr. A. Cleary
Mr. S. Tagg, J.P.	Mr. T. Prince
	Mr. J. Blades

Joint Secretaries.

Employers' . . . . . Mr. J. H. Sillitoe
Employees' . . . . . Councillor J. Williams, J.P.

Honorary Auditors.

Employers' . . . . . Mr. J. H. Clegg
Employees' . . . . . Mr. J. Blades

Honorary Treasurer.

Alderman Sir William Kay, J.P.

Manchester District Institution in 1896

In connection with last week's meeting of the Manchester District Institution of Gas Engineers, under the Presidency of Col. W. M. Carr, of Stretford, the photograph which we are able to reproduce to-day will be of special interest, inasmuch as it was taken on the occasion of the visit of the Institution to Widnes, when Mr. Isaac Carr was Gas and Water Engineer to the Corporation of that town. Many readers will derive particular pleasure from picking out old friends and staunch supporters of the Institution. In addition to Mr. Isaac Carr, we notice among many others whose names were, and still are, familiar throughout the Gas Industry, Mr. W. Carr, Mr. W. Dickenson, Mr. Walter King, Mr. S. Meunier, Dr. Thomas Newbigging, Mr. R. G. Shadbolt, Mr. John West, and Mr. Charles Wood. The Mayor of Widnes (Alderman Sadler) is wearing his chain of office.

A New Storage Water Heater

The "Optimax"

M. Mutrux in Monats-Bulletin des Schweizer. Verein von Gas- und Wasserfachmännern, 1931, 11, 9-18 (Jan.), describes the "Optimax" storage water heater.

The reservoir is cylindrical and is constructed of strong, hot galvanized, autogenously welded plate. It holds 28 gallons of water, weighs 215 lbs., and has a height of 47 in. and a diameter of 16 in. It is tested twice at a pressure of 220 lbs. per sq. in., before and after galvanizing. The inlet and outlet water pipes and the return circulation pipe are all situated at the top of the boiler, installation being therefore very simple. The reservoir is open below to enable the combustion chamber to be fixed.

Insulation.—The insulating covering at the lower end and around the thermostat is of slag wool, the remainder being of baked granulated cork. Its thickness is 2¾ in.; hence cooling is very slow. With the pilot flame on and the water initially at 168° Fahr., the temperature drops to 150°, 138°, and 124° Fahr. after periods of 6, 18, and 42 hours respectively. The use of baked cork prevents the development of moulds which might otherwise occur due to condensation on the interior of the insulation.

The Combustion Chamber is made of silumin, which has the same properties as aluminium but can be cast more readily. Its shape is such that the hottest gases strike the crown and part with their heat while descending and not while rising. The force to which it is subjected under test at a pressure of 220 lbs. per sq. in. is 18·5 tons; hence it must be strong. Its price is high, but, due to the high thermal conductivity of silumin, thickness does not militate against efficiency. The nuts and bolts which hold it in position are chromium plated to prevent corrosion. A good draught is always assured, because the gas descending alongside the walls and cooling is always denser than the ascending gas. The surface in contact with the gas is increased by gills, which also provide channels whereby the gas is prevented from passing direct to the outlet flue. This latter is of eternite and is lodged in the insulating covering.

Control of the Water Circulation in the Boiler is achieved by a species of double-walled iron bottle (A). This is perfectly tight and contains a layer of air between the walls. At the top of the neck is an aluminium regulating stopper (B) with a channel in it. This is accessible for adjustment and cleaning from the top of the boiler, and, by means of a special tool, can be withdrawn and overhauled and replaced in less than ten minutes. If any irregularity in the working of the boiler occurs—*e.g.*, excessive rise of temperature, formation of steam, &c.—the first point to investigate is the condition of the stopper, the hole of which may have become blocked with scale.

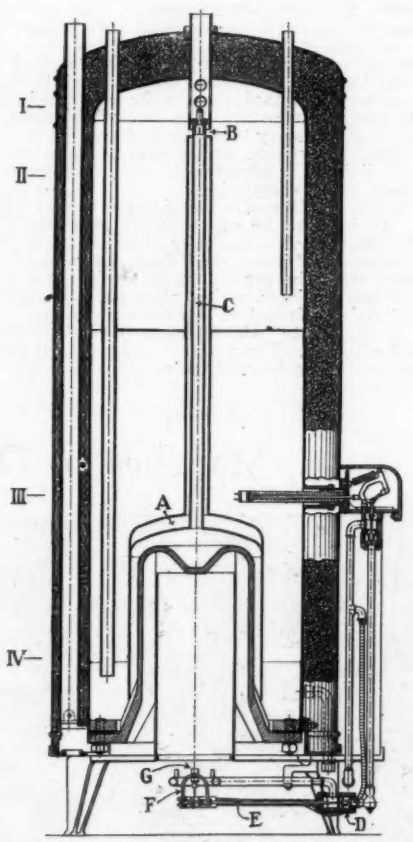
The water in the bell surrounding the combustion chamber becomes heated, and, due to its lightness, tends to rise. However, the regulating device prevents too rapid a circulation; hence the temperature increase is large. The heated water rises in the internal tube (C) of the flask with high velocity and spreads over the upper portion of the water in the boiler without disturbing the water in the lower levels. Thus a constantly increasing thickness of very hot water collects at the top of the boiler and finally reaches the level of the thermostat. The sharp separation between the hot and cold water is shown in the following table, which gives temperatures at the four different levels shown in the diagram:

Level.	Temperature, ° Fahr., After Time Stated.				
	15 Min.	30 Min.	60 Min.	120 Min.	150 Min.
I.	130	155	170	195	203
II.	65	120	155	180	188
III.	57	59	75	110	130
IV.	63	63	86	105	115

The special type of circulation provided enables adequate supplies of hot water for household purposes to be available very shortly after the morning bath requirements have been met.

The Thermostat—a very sensitive one—is of the liquid type and consists of a hermetically sealed copper tube filled with petrol. Its movement is transmitted to the gas valve by means of a spring-controlled release. The gas is cut off completely as soon as the working temperature is reached, and is turned on again when the temperature has dropped by 21°-32° Fahr. according to the adjustment. The release is arranged so as to store up, during a relatively long period, energy provided by the expanding petrol, and to give up this energy instantaneously, thereby abruptly opening or closing the gas valve. Its principle depends on the alignment of three points. The movement is mathematically determined and is independent of the force of the springs, nor does it depend on the elastic deformation of the material. All parts of the thermostat are either of non-oxidizing metal or are heavily nickel plated. The force exerted by the component pieces is at a minimum and fatigue of the materials is practically *nil*. Regulation within wide limits is possible by merely altering the length of the rod by turning a screwed cap.

The range between lighting and extinction is adjusted very simply by means of two screws. This range is 7 gallons, and the cold water must reach the level of the thermostat before the latter operates. The mechanism does not function each time a quart of water is withdrawn, and the temperature of the contained water does not fall because the water does not diffuse.



"Optimax" Water Heater.

An abrupt movement was provided because, when the rod of a thermostat acts directly on a valve, it is not possible to secure a complete shut-off. Normally, the height of the flames diminishes as the temperature of the water rises, and a long time is required for heating the water. An abrupt action enables the burners to run full-on to the very last, so that the capacity of the boiler is appreciably increased without the need for very large flames. A complete extinction of the burners has a good psychological effect on the consumer.

The Control Valves are of aluminium and are constructed so that they are normally shut. Hence, in the unlikely event of a spring breaking, the gas is shut off. Their simple construction safeguards against any breakdown.

The Burners are of the Bray type and are 8-10 in number. Combustion is complete, the flames being semi-luminous. Supply of gas is controlled by a valve (D) similar to that of the thermostat. For this valve to be open, an external force acting on a rod (E) is necessary, and this is supplied by a bimetallic strip (F). The pilot flame, which is non-luminous, heats a block of aluminium (G) which transmits heat to the bimetallic strip and bends it, the necessary force being thereby created. When the sup-

ply of heat ceases, the strip resumes its shape and the rod is drawn back and closes the valve. The bimetallic strip employed is of exceptional quality as regards freedom from deterioration, and has been used in the electrical industry for several years. The valves cannot stick, their parts being of non-oxidizing material (aluminium) with the exception of the springs, which are of nickeled steel, and the control rod, which is of brass. Tightness is secured by a copper seating. There is no stuffing-box to hinder the movement of the rod. The diaphragm is not subjected to any force; the movement is transmitted by way of a piece of metal. The base plate of the boiler and the feet are of cast aluminium.

De-scaling.—An encrustation on the stopper controlling the internal circulation is a sign that the boiler requires de-scaling. The use of softened water is expensive; hence the boiler is constructed so that it may readily be freed from scale. This is a distinct advantage, since some water heaters cannot be taken apart and can only be freed from scale by use of acid, which is very harmful. Depending on the quality of the water supply and the extent to which the heater is used, cleaning may be necessary once or twice a year, or even more frequently. Removal of scale may be effected in a few minutes. The connections at the top of the boiler are loosened and the boiler is laid on its side. The aluminium baseplate is removed and the bolts holding the combustion chamber in position are then accessible. When this is withdrawn, an opening 12 in. in diameter enables the circulation bottle to be removed, and it and the interior of the boiler can readily be cleaned.

Performance.—So far, two sizes are available, 28 and 39 gallons. The output is 225 gallons of water per day at 167°-176° Fahr. depending on the pressure and calorific value of the gas. The small size enables two baths, at a temperature of 102°-104° Fahr. to be prepared at once; the large size, three baths. According to the Federal Laboratory for Fuel Testing, the daily capacity is 12-15 baths, depending on their volume and temperature; the smaller model with feed water at 50° Fahr. gave 330 gallons of hot water at 142° Fahr. in 24 hours, or 240 gallons at 176° Fahr. As a geyser, the capacity is 16 gallons of water in 1 hour with a temperature rise of 58° Fahr.

Combustion is good and complete. The carbon dioxide contents of the waste gas before and after the baffler are 6·5 and 4·5 p.ct. respectively, and carbon monoxide has not been detected.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany

NEW PROCESS FOR THE RECOVERY OF PHENOLS FROM GAS LIQUOR.

A process patented by the I.G. Farbenindustrie, for recovering phenols by use of tricresylphosphate, is described by C. Schönburg in Brennstoff-Chemie, 1931, 12, 69-71 (Feb. 15).

In coke oven plants, where benzole is available and is used for extracting the phenols from gas liquor, the cost of phenol removal is covered partially or entirely by the revenue from the recovered phenols, or there may even be a profit. Conditions are different where the benzole has to be purchased.

A drawback to the use of benzole is that its power of extracting phenols from aqueous solutions is relatively low, and it has to be used in volume up to 25-45 p.ct. of that of the liquor treated. The volatility of benzole and its solubility in water lead to unavoidable losses.

Tricresylphosphate, which is now manufactured on a large scale, has a greater efficiency in extracting phenols than has any other liquid which has been tried. It is a stable, neutral liquid of high boiling-point and low vapour pressure, and is practically insoluble in water, dissolving to the extent of only 2·1-3·5 grains per gallon in gas-works liquor. Its specific gravity is 1·18. The partition coefficients of phenol, *o*-cresol, and *p*-cresol between tricresylphosphate and water are respectively 31, 16, and 17 times those between benzene and water; hence only small volumes of liquid have to be treated for recovery of the phenols. For the extraction of 100 gallons of ammonia liquor containing 3 lbs. of phenols, only 4·5 gallons of tricresylphosphate is necessary, and the concentration of phenols in the extract is 6-8 p.ct. A further advantage of employing tricresylphosphate is that the extracted phenols may be recovered merely by distillation, preferably under vacuum, whereas, when benzole is used, soda is required. The steam consumption per pound of recovered phenols is 5-6 lbs. The cheapness of the process renders it applicable to the smallest works where extraction of phenols is practised. By removal of the phenols from the gas liquor, ammonia still effluents are rendered less noxious. Tricresylphosphate has a selective action in extracting phenols, and hence does not extract appreciable amounts of neutral oils or tarry constituents from the liquor. For this reason, the recovered phenols are purer than when benzole is used, and the tricresylphosphate does not readily become fouled by accumulation of tar. Purification (by simple vacuum distillation) is therefore necessary only at long intervals.

The plant required is simple. The tricresylphosphate passes down a tower filled with this liquid. Liquor is introduced near the lower end of the tower by way of nozzles, and, mixing in a fine stream with the solvent by the agency of perforated plates, travels upwards through it. The extracted liquor is allowed to settle to recover entrained solvent, and the extract leaving the bottom of the tower is collected in a tank, whence it is sucked into a fractionating column working under vacuum and supplied with steam. The column is provided with a suitable heating element whereby the necessary temperature is maintained. The dephenolized tricresylphosphate leaves the bottom of the column by way of a barometric seal. The condensed phenol-water mixture obtained is separated into its constituents in a separating vessel, the water which is saturated with phenols being added to fresh liquor for retreatment.

The process is operating at Bitterfeld and at Leuna on a large scale, and at the Auguste Viktoria Works at Hüls on an experimental scale.

In spite of the high cost of tricresylphosphate, the process is profitable with a liquor amounting to 45,000 gallons per day, even though the liquor contains only 0·1 p.ct. of phenols—*i.e.*, for a total daily content of 450 lbs. of phenols. The profit depends primarily on the daily amount of phenols, the cost of power, and the revenue from the recovered phenols.

PNEUMATIC COAL CONVEYING IN A GAS-WORKS.

The description of the reconstruction of the Uster Gas-Works by F. Bachmann in "Monats Bulletin des Schweizer. Vereins von Gas- und Wasserfachmännern," 1931, 11, 1-9 (Jan.), is of interest in that it contains an account of the pneumatic coal conveying equipment installed to overcome difficulties in delivering the coal from the railway to the works. A small house containing a coal breaker was erected alongside the permanent way and was linked up to a pneumatic conveyor having a capacity of 8 to 10 tons of coal per hour. The trucks are delivered to the crusher house by the railway and are hauled away when empty, a charge of 1s. 7d. per truck being made. From the trucks, the coal is delivered to a bar screen. The fines fall into a hopper, and the oversize is delivered to a double-roll crusher which breaks the coal down to 1⅛ in. A small screw conveyor under the hopper and crusher delivers the coal to the pneumatic conveyor, the pipe of which is of 4½ in. bore. The pipe passes under a road and comes to the surface in the coal store, rising vertically to the distributing tower. By way of a rotary valve, the coal is fed to a conveyor and passed to the various silos. The blower, which takes 18-22 H.P. is coupled to a motor *via* a reduction gear. The coal crusher and distributing conveyors are each driven by a 10-H.P. motor. The power consumed is approximately 3 KW.-H. per ton of coal, and maintenance costs are very low.

The cost of the installation, including crusher house and erection, was £1360. Compared with the previous arrangements for handling the coal, a distinct saving is shown, since only one man is required for unloading the coal.

A slight drawback of the system is that the coal must be stored in the crushed condition. It loses a little in gas making quality, but to an insignificant extent; also the danger of spontaneous combustion is increased. In the 3½ years during which the system has been at work, a silo had to be emptied, owing to overheating, on two occasions.

According to the literature, the coking quality of the coal should fall off, but this was never experienced, an excellent coke being always obtained.

NEW "W-D" VERTICALS AT RUGELEY

An Account of the Official Inspection, on March 3, of a Continuous Vertical Retort Installation installed at the Works of the Rugeley Gas Company by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd.

To meet increased demand for gas, tenders were invited for the installation of new carbonizing plant in the year 1929. After careful consideration it was decided to erect an installation of Woodall-Duckham continuous vertical retorts having a nominal daily capacity of 270,000 c.ft. of gas of 475 B.Th.U. per c.ft. calorific value, the particular advantages of this type of plant being the small ground space necessary in relation to capacity (which avoided the necessity of the acquisition of additional land), the minimum amount of labour required for the operation of the plant, and the elasticity in working to meet fluctuating demand in a comparatively small output of gas.

The construction of the plant was commenced in October, 1929, and the whole installation was completed in a period of seven months from the commencement of work on the foundations.

The Company was the first in the country to apply the block system of charging for gas to all its customers. This system has been recognized in America as offering great advantages to all consumers making normal use of the gas service.

Service to the consumer is a slogan which is not lost sight of, and in 1929 up-to-date and well-equipped showrooms were opened in the main shopping centre of the town for the convenience of consumers.

The New Vertical Retorts.

The installation consists of one bench containing three retorts heated by means of two producers placed at the ground floor level at one end of the bench.

Coal is fed into a small receiving hopper at yard level from carts. The receiving hopper is provided with a strong grid of 3½-in. mesh to prevent any large pieces or foreign matter entering the hopper. From this hopper the coal is discharged through a quadrant door into a specially designed side discharging skip which is run into a 25-cwt. steam engine driven lift and elevated to the top level of an overhead storage hopper above the retort bench. At this level a platform is provided along which the skip is run and the coal is discharged into the overhead storage hopper.

From this storage hopper the coal is fed through special valves into auxiliary supply hoppers attached to the top mouthpieces of the retorts. These auxiliary hoppers are re-charged at hourly intervals.

Each retort is about 25 ft. high and of rectangular tapered shape being 53 in. by 10 in. at the top, so designed as to allow continuous regular movement of the charge through the retort.

The Retort Bench.

The design of the setting is in accordance with the latest practice of the Woodall-Duckham system, special features being as follows:

(1) Each retort is absolutely separate from the next. A straight hollow division wall 13½ in. thick is built between the retorts so that any individual retort may be heated up or cooled down without interfering in any way with the working of the other retorts. Straight joints are provided where necessary to take up expansion. Each retort is provided with its own producer gas, secondary air, and waste gas dampers, thus forming a separate heating unit. By this arrangement maximum flexibility in output is obtained.

(2) The retort faces and combustion chambers are constructed of the highest quality silica material for the full depth of the combustion chambers. This ensures low maintenance costs coupled with high output per retort.

(3) In order to provide means of varying the relation between the temperatures at the top and the bottom of the retort arrangements are made for the introduction of additional secondary air at a second point in the combustion chamber. It is thus possible to vary the zoning of the heat according to the type of coal to be carbonized and the calorific value of the gas to be made.

(4) Both the side walls and the top of the bench are heavily insulated with the double object of improving the working conditions and saving fuel.

Producers.

For heating the retorts two open-type producers, one large enough to supply the gas for heating three retorts and the other large enough to supply gas for heating two retorts, are provided at the retort house floor level at one end of the bench. They are arranged so that one producer may be shut down without interfering in any way with the working of the other producer. The gas from either of the producers may be taken to the heating flues of any of the retorts. The producers are of the step-grate type and are constructed with ample grate area. This type of grate eliminates the need for clinkering, the only attention required to keep the producer fire in proper condition is a periodical pricking up at intervals of four hours or longer, dependent on the class of fuel used. The tops of the producers are faced with good quality paving bricks laid on edge, with cast-iron plates laid on top of the brickwork to form a platform for the coke skip for feeding the producers.

Coke Handling.

The contents of the coke chambers below the retorts are discharged either into a mild-steel coke barrow running on the floor of the retort house or into the side discharging skip. For dealing with the coke required for the producers the skip is run into the lift and elevated to the producer charging platform. At this level it is run out of the lift on to a steel platform laid on top of the producer brickwork and the coke is discharged direct into the charging holes of the producers.

For dealing with the surplus coke the barrow or skip is taken through the end wall of the retort house into the yard, and coke is discharged into open storage as required.

The 25-cwt. lift is driven by means of an enclosed vertical non-condensing 12 brake horse-power steam engine direct-coupled to the hoisting gear.

For circulating ammoniacal liquor through the foul main two steam driven pumps are provided, one acting as a stand-by to the other. These pumps are also utilized by means of a Whittle belt and spur reduction gear to drive an overhead counter-shaft from which the extractor driving gear is operated.

Guarantees and Working Results.

As compared with the old horizontal retort plant, the continuous vertical retort system has given greatly improved results per ton of coal handled, together with a uniform quality and composition of gas produced. Some idea of what the plant is capable of can be gathered from the following results of the guarantee test carried out from Oct. 30 to Nov. 2, 1930, inclusive:

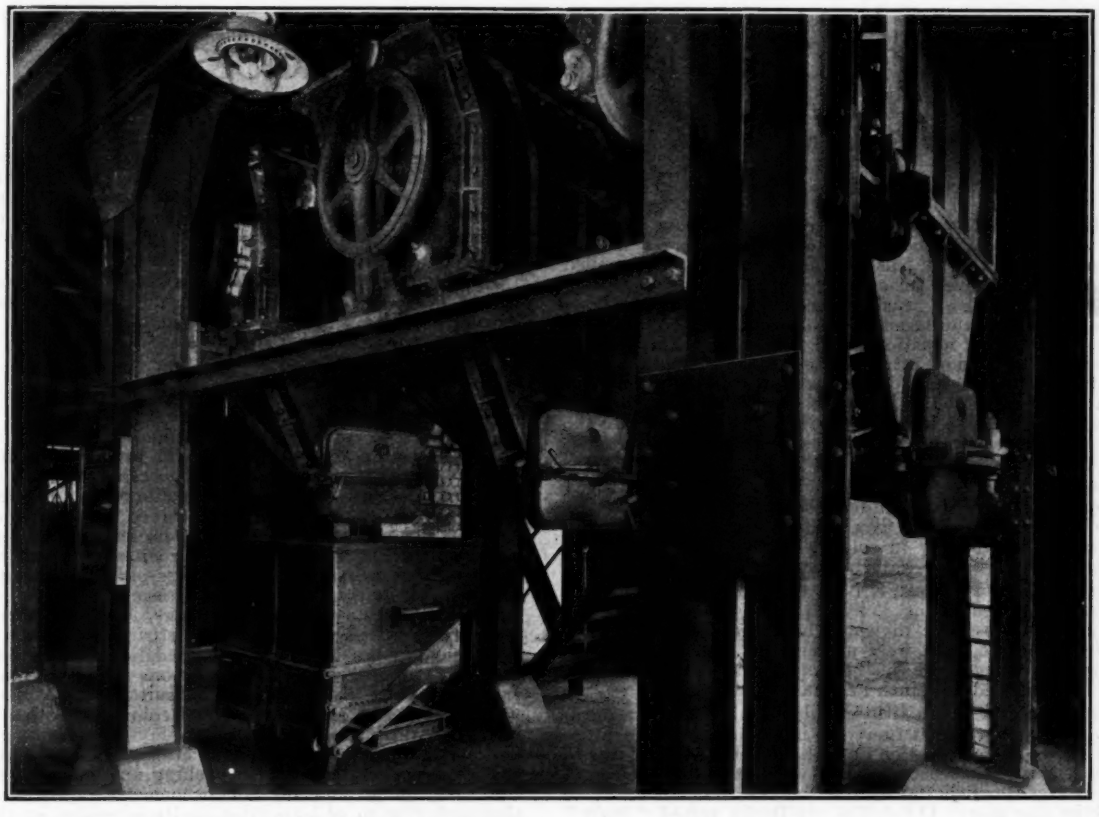
Coal { 50 p.ct. Chatterley Whitfield washed nuts; 25 p.ct. Fenton washed nuts; 25 p.ct. Madeley washed nuts } Staffordshire coals.

Items.	Test Results. Coal Corrected for Moisture Content.	Guarantees. Based on Coals with 2 P.Ct. H_2O.
Calorific value of gas	482 B.Th.U.	475 B.Th.U.
Throughput	6·68 tons	5·5 tons
Make per ton	17,440 c.ft.	16,420 c.ft.
Therms per ton	84·1	78·0
Make per retort	116,500 c.ft.	90,310 c.ft.
Fuel as charged	17·56 p.ct.	..
Dry fuel	17·4 ,,	..
Fuel: Dry coke (corrected for coal containing 6 p ct. ash)	17·9 ,,	20 p.ct.
Coal analysis	H_2O 5·18 p.ct.	..
Analysis on dry basis	V.M. 37·29 ,,	..
	Ash 4·02 ,,	..

Conditions: One retort working. Two retorts shut down cold.

Labour Conditions.

The improved labour conditions under which the retort house duties are carried out when using this system of continuous vertical retorts as compared with the older system of horizontal retorts are very striking. The absence



COKE EXTRACTORS, DISCHARGE DOORS, AND COKE SKIP.

of smoke and steam and arduous labour in the retort house generally are all points thoroughly appreciated by the workmen.

Mr. JAMES WM. GARDNER, the 81-year old Chairman of the Company, set the plant in motion by starting the extractor gear.

In proposing the toast of "The Rugeley Gas Company," at a luncheon which followed, Sir ARTHUR DUCKHAM, G.B.E., K.C.B., M.Inst.C.E., expressed great faith in the future of the Gas Industry. He said that even in these times of depression Rugeley had the courage to go ahead and make what was, for it, a major expenditure on these works, in order to keep abreast with the times. Here was a Company which had shown confidence in itself and in the Industry. Some people were frightened that gas had no future, but examples of progress all over the world showed that these fears were groundless. In Chicago the gas and electricity undertakings were under joint control, but gas was going ahead quicker than electricity. Surely the time would come, he said, when raw coal would not be burned, for it was to the gas companies that one looked for the conversion of coal into gas, coke, tar, and other products; and the collier would then have to work more to meet that increased demand. The Gas Industry had a large future in the sale of smokeless fuel. During times of depression, especially in the iron and steel works, the coke oven people invaded the gas companies' areas with the sale of coke to a large extent, but many of them hoped that a change in the political associations might result in some modicum of protection being given to the heavy industries. He could assure them that protection would increase the output of the steel works and furnaces, and the gas companies would then have a tremendous demand for coke. Work meant more trade, and the Rugeley Gas Company had therefore assisted trade at the present time.

Mr. JAMES GARDNER responded to the toast. He said the Company had been progressive since it started. What they, and every other gas company, complained of was the unfairness with which they were treated by Governments as compared with electricity. The gas companies were tied down by old Acts of Parliament which were long since obsolete so far as the dividends they could pay. The Governments appointed committees, but did nothing to help the gas companies, yet during the last few years they had given £33,000,000 to electricity by way of State guarantees. It was grossly unfair preferring one industry to another, and it was a thing a Government ought never to do. The Gas Industry welcomed competition, and were prepared to meet it, but they complained of unfair treatment.

"The Trade of Rugeley" was proposed by Mr. J. TILL, who said they in Rugeley were very deeply interested in all shapes of trade and were all as anxious as they could be to bring back all the trades they had in the past. He understood it was a place where they used to make hats and also they had a tin works and two important foundries. He thought they would have survived had they had the enterprise of the Rugeley Gas Company. The people of Rugeley were indebted to the Gas Company for their enterprise and the service they had rendered for many years.

Mr. A. R. TUNNICLIFFE, J.P., replied and said that the Rugeley Gas Company had that day given some indication of the manner in which they, as a business corporation, were anxious to help forward the march of progress. He sincerely hoped the example set by the Company would be followed by every business concern in the district.

GOOD AND CONSTANT GAS.

"The Contractors" was proposed by Col. W. M. CARR, the Consulting Engineer. He said they were fortunate in having with them the Chairman of the Contracting Company in the person of Sir Arthur Duckham, who was Chairman, Managing Director, and the moving spirit of one of the largest firms of contractors, which he had built up with his own hands from the smallest beginnings. The installation at the gas-works was the result of some of that work, and he had great pleasure in informing them it was as good as it looked. When the Directors decided to put down the most up-to-date plant they could, they realized that if they were to succeed they must give the best of service, and the best service they could give was a constant supply and constant quality of good gas. They selected, after very careful consideration, the plant which they had just seen, and the results which had been guaranteed by the contractors had been more than fulfilled.

COMPANY'S DOUBLED OUTPUT.

The development of the Company had been continuous, and the output to-day was two-and-a-half times greater than it was when he first became associated with the Company in 1911. Although Rugeley was a small town, they were the first in the country to adopt the block system of charges as applicable to the whole of the consumers, which gave appreciable benefits to those who made the full use of the service. He was satisfied the Rugeley Gas Company had obtained full value for the money they had expended on the plant, and he hoped they would be able to give further benefits by getting the price of gas on a still lower basis. He had never been more confident in the future of the Gas Industry than he was to-day.

NOTES ON PLANT AND PROCESSES

A New Rust Preventive.

Application of Liquid Lead.

A few days ago we had explained to us a new rust preventive which is bound to be of great interest to our readers. Known as "Nust," this material is a liquefied lead, and is employed for coating iron and steel. The first discovery of "Nust" was made some ten years ago by a Swiss professor, who is adviser to the Swiss Federal Railways on rust-proof questions, and a member of the German Imperial Commission on the protection of metals. He found he could so treat lead that it could be applied as paint. The oil which is contained in "Nust" is merely a conveyor to hold the lead so that it can eat its way into the iron or steel, and form a positive amalgamation with it. This impregnation, we were told, is absolutely impervious to the action of rust.

Applied (with a brush) in one coat, it is sufficient for the purpose. It can be used as a primer, and other paints applied. Battleship grey in colour, "Nust" is not affected by heat or cold, by sea water, by smoke gases, or acids.

Messrs. Riley, Harbord, & Law, Consulting Metallurgists, of London, tested "Nust" by exposure to strongly corrosive moist atmosphere in which large quantities of nitric and hydrochloric acids were present; and the material has not broken down under this and other tests, although they have been carried out since February, 1928.

The Swiss Federal Institute, which made extensive durability tests, reports that there has been no rust or cracking, and that on the completion of each test the metal plates to which "Nust" has been applied were sharply bent round a one-sixteenth inch thorn, and the skin did not crack or break in any case. The A.E.G. of Berlin tested "Nust" for three years, at the end of which time the layer was still intact, and in no place was there any sign of rust formation. The Berne Institute also tested metal for the removal of the "Nust." They applied every process for removing paint. They knew, to begin with, the quantities of oil and lead which had been used, and, on weighing up the quantities that they had been able to remove they found they were still a large percentage of lead short, and the only way it could be got off the metal was by a definite metal separation process.

Mr. J. C. Miners, of Nor-Rust, Ltd., of Bristol, explained to us that experiments made in Germany have proved there is no paint which will stand the stretching of the steel or iron to which it is applied by more than 0·05 p.ct. without scaling or cracking, but that "Nust" has stood the test when the metal to which it has been applied has been stretched a full 1 p.ct.

The problem which faced the Nor-Rust Company was the production of this material on a commercial basis. This has been accomplished, and the manufacture of "Nust" is now about to take place on a large scale.

We were informed that the manufacture of this new material is 100 p.ct. British, and that large extensions of the firm's factory at Bristol are already in progress.

Graphite Products for Gas-Works.

A pamphlet recently issued by Graphite Products, Ltd., of 218-220, Queen's Road, Battersea, S.W. 8, deals with the firm's "Foliac" graphite products with special reference to their utilization on gas-works.

During the time that has elapsed since "Foliac" graphite products were first placed on the market, the manufacturers have obtained much useful knowledge of the lubrication problems which confront every gas engineer, with the result that they claim to be able to offer British graphite products which may be relied on to stand up to the conditions met with in gas-works. Some of these have been prepared to gas engineers' own specifications, and in every instance the material submitted has given entire satisfaction.

Mention is made of a graphite purifier cover compound which is painted on the rubber rings before the covers are replaced, thereby preventing the rings from sticking and tearing when the covers are removed. Another product is graphite gas cock grease which is manufactured in accordance with the specification of the Gas Light and Coke Company. It has been thoroughly tested under all conditions and found to give entire satisfaction. The minute particles of graphite in this lubricant become embedded in the fine scratches and marks in the gas cock tap, and build up a practically frictionless film which ensures smooth action, absence of wear, and a gas-tight cock. This film cannot squeeze out or be affected by heat. Being pure petrolatum, the grease is acid-free and cannot attack the metal.

Two further publications recently issued by the firm deal with "Foliac" paints, including silica graphite, heat-resisting, finishing, and aluminium paints, and with graphite for lubrication and other industrial uses.

A Coming of Age.

An interesting "majority" that is being celebrated this year is the completion of 21 successful years by the Kleenoff Company under the proprietorship of Messrs. Bale & Church, Ltd. We have ascertained that each one of these has shown an increase in sales, and there is a fixed determination on the part of the Company that all records shall be broken in the coming-of-age period. A feature of the Kleenoff policy of prime importance to retailers, among whom are so many gas undertakings, is the support given to them by extensive national advertising. For this year a special campaign has been arranged, and a new series of attractive photographic reproductions has been made for the important daily papers and for suitable ladies' journals, while a new and artistic design of coloured showcards are available which are suitable for display in the most modern and up-to-date showrooms. Careful attention is paid to the all-important matter of packing the material in tins that are sound and do not become damaged, and the thorough system of inspection and supervision at the factory could not well be improved and insures that Kleenoff is always of the standard quality which is associated with the trade name.

A Multi-Purpose Machine Tool.

We have had brought to our notice a highly interesting machine tool which is sure to attract attention in the Gas Industry. Compact in design and light in weight, the machine is the outcome of years of experiment.

The traversing head makes it possible to make cuts parallel to one another at one setting of the work, and also enables the saw to deal with work which cannot from its form or size be placed between the saw and the work table. A four-faced saddle provided with a swivel vice permits of work of almost any shape being held in the desired position and at the required angle under the saw.

External keyways can be cut, and, by using formed tools, external gears also. The cutting of flats, cutting to a shoulder, and the cutting of taper keyways can be effected, as it is possible to control the angle, both horizontal and vertical, of the cut and also the depth of cut. The swivel table and cross-traverse of the head are of use in these operations.

By the substitution of a file for the saw (a substitution which is made easy by the form of tool-holding clamps used), and by the use of the lifting device, mechanical filing can be done with the utmost precision. The rotating work table, which can be locked at any desired point, permits of filing to any desired angle.

The cutting of blind-ended internal keyways can be undertaken easily, owing to the manner in which the work table can be adjusted longitudinally, the depth of cut fixed, and also by the use of the cross traverse of the head. Square holes can also be cut through the same ability to traverse and to control the depth of cut.

The shaping of flat surfaces can be rapidly effected owing to the ease with which the work can be held under the reciprocating arm at any angle, and the exact manner in which the depth of cut can be controlled.

By the use of special cutters, a strongly designed carrier for which is provided with each machine, shafts can be splined, and holes of practically any required shape produced.

The "Multi-Purpose" machine tool, which is made by Multi-Purpose Machines, Ltd., 85-86, New Bond Street, London, W. 1, is, on account of its lightness, readily transportable.

THE "JOURNAL" TECHNICAL RECORD

Which also contains Full Reports of Meetings of Gas and Allied Associations ———

Manchester District Institution of Gas Engineers

Presidential Address of Col. W. M. Carr, T.D.

The 61st Annual Meeting of the Manchester District Institution of Gas Engineers was held on Friday, March 6, at the Midland Hotel, Manchester. Mr. W. J. SMITH, of Bolton, presided during the first part of the proceedings. In moving the adoption of the Annual Report and Statement of Accounts, he said he wished to draw attention to the item in the Report which had reference to the financial position of the Institution. The Committee felt it would not be wise to take drastic action at the present time, but if the accounts did not improve they might have to take a different view.

There were some matters which did not appear in the report, but which should be mentioned. Several appointments had been advertised in the Technical Press at salaries which the Committee considered inadequate, data were collected, and representations were made to the Institution of Gas Engineers. Notice had been taken of those cases by the Institution.

The members had given more attention to the ballot papers, with good results, as would be seen from the list of representatives on the Council. It was to be hoped that would be maintained. The Committee had had under consideration the question of district representation. A Sub-Committee had dealt with the matter, and it was felt that the question should be further discussed by the full Committee. Also there was a question of changing the title of the organization. A suggestion had been made to change the name from "Institution" to "Association." That matter would be considered more fully at the next meeting of the Committee.

Mr. C. S. SHAPLEY (Leeds) seconded the resolution. He said that at one time the Manchester District had only one representative on the Council of the Institution of Gas Engineers. He made certain representations, and he was pleased to see that the members now made more use of their votes than they did in the past, and that they had seven representatives on the Institution Council. It was a matter for congratulation.

The resolution was carried unanimously.

REPORTS OF COMMERCIAL SECTIONS.

Mr. H. R. S. WILLIAMS (Altrincham) moved the adoption of the report of the Lancashire Commercial Section. He said that nothing of outstanding note had occurred in the twelve months, but a number of very interesting meetings were held and many subjects were discussed. It provided a very good platform for the purpose of discussing subjects which had a bearing upon the commercial management of gas undertakings; but many members were not getting full advantage from their membership because they did not attend the meetings. Not only were they losers themselves; their colleagues were deprived of the benefit of the contributions they might have made to the debates. Many interesting discussions had taken place about suggested new uses of gas. Those who wanted information on those matters profited from the experience of others. Hopes had been entertained that the action of the National Gas Council in calling a meeting of the Commercial Sections to discuss the question of coke would have a more practical outcome than had been the case hitherto.

Mr. J. H. CLEGG (Burnley) seconded the motion, and it was agreed to.

Mr. E. H. HUDSON (Normanton) moved the adoption of the report of the Yorkshire Commercial Section. He said that, along with the Lancashire representatives, they attended many meetings of the British Coke Producers' Export Association in London, hoping to regulate the export of coke—both their own coke and that from coke ovens. Much good came from those conferences, but the season was too far advanced for practical effect to be given to it for the present winter. No doubt the conferences would be revived, and the Lancashire and Yorkshire representatives would do their best to protect the interests of the members. Perhaps the most important question which had come before the Committee during the year was the Area Gas Grid Development. The Government had set up a Departmental Committee to make inquiries. At the end it centralized on Lancashire and Yorkshire. The two sections joined forces, meetings being held in Manchester and Leeds; and he thought the governing body of the National Gas Council would give them credit for having prepared evidence which was worth something. The Committee of the Section invited individual members to take advantage of every opportunity to urge upon highway authorities the claims of British tar for use on roads.

Mr. A. L. JENNINGS (Cleckheaton) seconded the adoption of the report.

The resolution was agreed to.

GRANT TO THE BENEVOLENT FUND.

The agenda contained a recommendation by the Committee that five guineas be granted to the Benevolent Fund of the Institution of Gas Engineers.

The PRESIDENT stated that the Committee regretted that the finances of the Institution did not permit a grant of ten guineas to be made on this occasion.

Mr. R. E. GIBSON (Liverpool) pointed out that at one time the Institution subscribed 20 guineas. This had been reduced to ten guineas, and a further reduction to five guineas was contemplated. He did not approve of this. So he moved that the grant to the Benevolent Fund be ten guineas.

Mr. E. H. HUDSON (Normanton) seconded the motion, and it was adopted.

APPOINTMENTS OF REPRESENTATIVES.

Mr. W. B. MCLUSKY (Halifax) moved the adoption of a recommendation by the Committee that Mr. W. J. Smith (Bolton) be appointed the representative of the District Institution on the Council of the Institution of Gas Engineers. This motion was seconded by Mr. R. H. GINMAN (Leek) and agreed to.

The PRESIDENT moved, and Mr. S. FRITH (Runcorn) seconded, that Messrs. W. Buckley (Manchester) and W. B. McLusky (Halifax) be appointed representatives of the District Institution on the Councils of the Lancashire and Yorkshire Junior Gas Associations respectively. The motion was agreed to.

INDUCTION OF THE PRESIDENT-ELECT.

The PRESIDENT said his year of office had come to an end, and he had now the pleasing duty of inducting his successor, Col. W. M. Carr (Stretford). Throughout the year he (the speaker) had been sensible of the great honour the members conferred upon him in choosing him to occupy that position during the diamond jubilee year of the Institution. He thanked the Committee and the members for the splendid way in which they had supported him. Especially was he grateful to the Secretary, Mr. Bridge, upon whom the work mainly fell. Col. Carr, who was to follow him, was not only a very fine gas engineer, well worthy for that reason to be their President, but he was undoubtedly an outstanding personality ["hear, hear"], and he had often proved himself to be a friend to many people in the Industry. His help was frequently sought and was freely given. He had great traditions to follow. His uncle, William Carr, was President of the District Institution in 1880; his father, Isaac Carr, was President in 1896. The excellent service which those two gentlemen rendered to the Institution was remembered, and there was no doubt that Col. Carr would live up to the example they set him. He had the courage of his convictions, and his words were the outcome of deep thought and strenuous work. The

Gas Industry required men like Mr. Carr to keep them up to concert pitch. Already he had done yeoman service with regard to tar. His Chairmanship of the Lancashire Co-operative Tar Scheme left nothing to be desired.

Col. CARR thanked Mr. Smith for his kind words, and requested him to accept from the Institution the Medallion which is given to Past-Presidents. Col. Carr said that Mr. Smith had upheld the highest traditions of the Institution and could now look back upon a successful year. With great ability he had guided the members in the discussions upon the subjects which came before the Institution.

PRESIDENTIAL ADDRESS

of Col. W. M. CARR, of Stretford.

In addressing you to-day, permit me to repeat my thanks for the honour you have done me in electing me your President. It is very gratifying to me to be the third representative of my family to occupy this position, following my uncle, the late William Carr, who was your President in the year 1880—51 years ago—and my late father, Isaac Carr, M.Inst.C.E., who was your President 35 years ago in the year 1896. I shall, to the best of my ability, endeavour to uphold the high traditions of my predecessors in the Presidential Chair of the senior District Institution.

PROPOSED CHANGE OF TITLE.

In using the word "Institution" I am reminded of the proposed change in our title, which will be submitted for your consideration at the suggestion of our parent Institution. I have no sentimental objection to the change in our name; for example, the words "Manchester District" are somewhat limiting when it is realized that the area to which they refer covers practically the whole of Lancashire, Yorkshire, Cheshire, and part of Derbyshire. I trust, however, should you agree to change our title, that it will not mean a weakening of affiliation with our parent body, the Institution of Gas Engineers; but, on the contrary, I am hopeful that there will be a strengthening of the ties between the parent body and the District Association for the better co-ordination of our work and the interests of the Industry as a whole.

COAL MINES ACT.

There have been, in the past year, two happenings which may have far reaching effects upon our Industry. First, the passing of the Coal Mines Act, with its District Committees for the unification and co-ordination of marketing arrangements, must ultimately affect our Industry for better or worse. It cannot be denied that the prosperity of both gas and coal industries is largely dependent upon the price at which their products can be sold. The new Act, however, provides for quotas for collieries irrespective of their cost of working and quality of their product.

In these circumstances, it is difficult to be optimistic as to the result of any re-organization or amalgamations brought about by the provisions of this Act, as re-organization of any industry can only be beneficial in so far as it eliminates the inefficient.

It is possible that from the classification and evaluation of coals by the District Committees some benefit may accrue to buyers; it will, at least, cause both the collieries and the sellers of coal to have a closer and better knowledge of the condition, quality, and cleanliness of the product they are handling.

It is an astonishing fact that comparatively few collieries maintain a chemical staff for the daily examination and evaluation of the coals they are selling, and I frequently receive from collieries analyses of coal made as long ago as two or three years, and reputed to be indicative of what is being produced from the same mine to-day.

The classification of bituminous coals as being suitable for gas-works purposes is one of considerable difficulty, and it would appear that the general classification will have to be a very broad one covering bituminous coking coals and low-carbon bituminous gas coals.

In the case of steam raising coals, classification is simple, as the coals can be arranged in accordance with their calorific value—which is, of course, directly affected by moisture and ash content. In the case of gas coals, however, the calorific value is of little assistance in classification, and it would appear that preliminary classification would have to be on the basis of inert content and caking index, and more detailed classification could be effected by evaluation in assay plant allowing full value for gas and residual yields corrected for inert matter.

AREA GAS SUPPLY.

Secondly, the Report of the Departmental Committee on Area Gas Supply was published in the year, containing a proposal for a gas grid in South Yorkshire for establishing and operating a network of gas supply fed by the surplus coke oven gas available from the coking plants in the area. The report bases its recommendation for a gas grid on the justifiable conclusion that cheap gas is essential to the development of gas sales for industrial purposes.

The report by no means conclusively proves that, given the same price for coal at the pit head, it is cheaper to manufacture in coke ovens at the pit head and distribute to a high-pressure gas grid, than to transport the coal to be manufactured into gas at points in closer proximity to the desired supply. If the gas grid is, in the long run, to provide cheaper gas, it can only be by the fact of there being a better market for the disposal of the residual products at the pit head; and there is, I consider, a great danger of under-estimating the cost of unproductive mains in a grid covering a large area.

This fact is patent in the electrical industry, where it has been found that savings effected by super-generating stations in many instances are lost in the extra cost of distributing over a large area, and that the electricity grid cannot, therefore, afford a cheaper supply of electricity than was originally afforded by the separate undertaking, which was well equipped and managed. Taking into account standing and other charges, there can be little difference in the cost of manufacture in an undertaking of normal size, and the cost of purchasing unpurified coke oven gas.

The following table shows the actual cost into holder in a gas undertaking selling approximately 1000 million c.ft. per annum, all of which is purchased from coke ovens, compared with the actual cost of gas into holder in the Stretford Undertaking for the same period:

Comparative Cost of Gas into Holder on Basis of Annual Accounts

—	Stretford Undertaking.	Larger Undertaking Taking Coke Oven Gas.
	Pence per 1000 C.Ft.	Pence per 1000 C.Ft.
Coal, gas oil, coke used on C.W.G. and in manufacture of producer gas, electricity, water, &c., including fuel for boilers	16·2	0·41
Less receipts from residuals	11·5	..
	4·7	0·41
Purification	0·32	0·28
Salaries	0·65	0·71
Wages	2·06	0·30
Repairs of works and plant	3·44	2·36
Cost of gas purchased	..	6·84
Net cost into holder	11·17	10·90

The undertaking compared is in close proximity to the coke ovens from which it draws its supplies, and it is reasonable to assume that the cost into holder would have been at least 2d. per 1000 c.ft. more if it included the standing charges of a gas grid.

The comparison I make includes the charges incurred by the gas undertaking buying coke oven gas in maintaining its own gas-making plant as stand-by; this is, of course, essential in the absence of absolute safeguards to protect the gas undertaking in the matter of the price to be paid for coke oven gas, and also in the absence of statutory obligations being placed upon the coke ovens to maintain the supply.

The placing of gas supply in the hands of the collieries, whose principal interest may be considered to be the sale of coal for both industrial and domestic purposes, must be fraught with some danger, as a low selling price for gas will tend to the further displacement of house coal, and the amount of coal required will be proportionately less by reason of the low efficiency of burning coal to destruction in an open fire.

There is a competitor, however, to a limited extent in the domestic field, and to an unlimited extent in the industrial field, in crude oil, which may tend to prevent exploitation of either coal or gas as a means of heating.

The New Year has opened with a brighter outlook in that the Board of Trade have appointed a strong Committee to consider the recommendations in the Report of the National Fuel and Power Committee, and to put forward proposals as to what amendments to existing legislation are desirable and necessary to give effect to those recommendations by general resolution or by Special Order. The results of the deliberations of this Committee are awaited with eager anticipation in the hope that the resultant legislation will give us freedom in the matter of charging, at least equal to that enjoyed by the electrical industry.

It is now generally admitted that a flat rate charge, coupled with an obligation to supply, and designed to meet the requirements of the days when gas was, in effect, a lighting monopoly, is, even when modified by a system of discounts, an unsatisfactory and unfair basis of charge. It takes no account of the fact that a greater part of the

cost of gas is absorbed in standing and service charges, and, in consequence, is in itself a direct hindrance to the general cheapening of gas supply, and extension of its use.

The question of the relationship between the cost of production, distribution, and selling price, was very ably discussed in the Presidential Address of your President of 1929, Mr. W. B. McLusky, of Halifax, who is not only a strong advocate of reform, but himself a pioneer in the introduction of a two-part charge.

Load Factor and Systems of Charge.

The load factor, particularly when considered in its relation to standing charges, is as important in the gas as in the electrical industry. The effect of a dual service of electricity for lighting, and gas for heating and cooking, in the majority of the housing schemes carried out during the past few years, has tended to lower the load factor. It is essential, therefore, that we should spare no effort to increase the consumption of gas per consumer, and particularly the consumption outside the peak hours, which, in the majority of undertakings, coincide with the cooking loads. It is generally appreciated that the best method of bringing about an improved load factor is by means of a system of charge that will give a low price for gas taken outside the peak loads.

It is, however, difficult to put such a charge into operation, as it necessitates the use of double-dial meters operated with clockwork attachment. While this is practicable in the case of large consumers and industrial users of gas, it is too costly for general application in the case of the smaller domestic consumers.

The introduction of a two-part charge on the basis of a fixed service charge, as distinct from a fluctuating demand charge, or, alternatively, a block system of charge, certainly tends to encourage consumption by gas fires and for water heating, a great deal of which will automatically fall outside the peak load; and some undertakings have, with great advantage, introduced modified block systems of charge within the limitations imposed by their maximum price.

It is incumbent upon each and all of us to keep careful watch upon the load factor of our undertakings in relation to cost, quarter by quarter; and when considering a revision of price, to make such revision, where possible, to encourage and increase the consumption per consumer.

The introduction of an optional two-part system of charge for industrial users in the Stretford area has proved of the greatest benefit in increasing the consumption and improving the load factor. The charge was brought into operation at the end of the financial year ended March 31, 1928. The sale of gas for industrial purposes in that year amounted to 793,709 therms. In the first year of the operation of the charge, ended March 31, 1929, the sale of gas for industrial purposes amounted to 849,840 therms, and for the year ended March 31, 1930, the sales amounted to 1,156,326 therms, equivalent to an increase of no less than 45·6 p.ct. in two years.

Of the total gas sold for industrial purposes, no less than 901,380 therms, or 78 p.ct., was sold to industrial consumers under the two-part system of charge.

Another advantage of this two-part tariff, which is based upon the maximum 12 hours' demand, is that it has encouraged large industrial consumers, where practicable, to distribute their heating load over 24 hours.

The large increase in the sales of gas for industrial purposes is, in the main, attributable to the advantages of the two-part charge; at the same time, it could not have been achieved without close attention to service and advice to manufacturers.

The problems arising in the supply of industrial gas are very different from those of domestic supply; almost every application requires special consideration to meet the particular requirements of the manufacturer; and while, in a proportion of cases a standard furnace can be found which will meet the particular case, in many others it is necessary, if a high efficiency is to be obtained, for a special furnace to be constructed to meet the particular requirements of metal, temperature, throughput, &c., arising in the process for which the heat is required.

Furnace Design.

I am only a learner in the industrial application of gas. I have found from experience during the past few years that there are far too many industrial gas appliances working at low efficiencies. Gas furnaces are too often designed to be sold at a low competitive first cost, and then very often following the lines of furnaces previously constructed for use with solid fuel. In many cases, insufficient consideration is given to insulation, and nothing is done in the form of heat recovery. The introduction of pre-heaters and regenerators in many high-temperature gas-fired furnaces in use to-day will give an increased efficiency which would very quickly repay the higher capital installation cost.

I make these observations with a view to emphasizing that the industrial load, which to-day awaits us, is not to be attained by the setting-up of a showroom containing a few standard furnaces, but rather by applying ourselves to the problems in the manufacturers' works themselves; and in this connection I should like to express appreciation of the work that is being done by the Birmingham Corporation Gas Department's Industrial Research Staff, and of the facilities, advice, and assistance which they have been good enough to afford the undertaking which I control, in addition, I believe, to many others.

Education of Salesmen.

The British Commercial Gas Association scheme for the education and training of gas salesmen has been carefully thought out, and marks a great advance in that side of our training which has been most neglected in the past.

It is inevitable that the chief link between a gas undertaking and its customers should be the inspectors, maintenance men, and fitters who visit the consumers' houses for the purpose of carrying on the service of the undertaking. It is therefore essential that all these men should be carefully selected, and trained in the principles of salesmanship.

In order to encourage all members of the staff who are in touch with the consumers to make openings for new business, a system of commission payments on sales was introduced at Stretford some six months ago. The commissions are perforce small, and are paid to the employee who initiates the inquiry. For example, a fitter, maintenance man, or meter inspector may interest a consumer in some appliance, and reports having done so; this interest or inquiry is followed up by the selling staff, and if and when the business is secured—no matter through what channel—the commission is paid to the employee responsible for initiating the inquiry.

This system is proving very effective. It has not resulted in an appreciable increase in the time taken for work on consumers' premises as indicated by the job vouchers. All fitters and others are instructed that they must not waste time in canvassing, but when asking the consumer to inspect and pass their work on its completion, they may mention any other business the possibility for which they have observed in the consumer's house. It is the practice of many of our employees who have obtained inquiries in this way to follow them up by calling upon the consumer in their own time after the day's work, and so make sure of the business and their commission.

It is now the custom of most undertakings to arrange for the payment of gas accounts at their showrooms, the number of accounts so paid varying with the district and the class of property. In Stretford, on the average, it is estimated that 50 p.ct. of all accounts are paid in cash over the counter.

The system of quarterly billing with discount days necessitates that all accounts are paid within a comparatively short period of (say) three weeks in each quarter, with the result that, unless the showroom staff is very considerably reinforced during these periods, the selling staff are unable to give sufficient attention to the large number of consumers coming into the showroom.

Continuous Billing System.

In order to overcome this defect, a system of continuous billing is being introduced into the Stretford Undertaking. Under this system, an equal number of accounts will be sent out to consumers on each working day of the year, and, therefore, the number of consumers visiting the showrooms to pay accounts will be constant, and not confined as at present to the quarterly rushes, thereby giving the selling staff in the showrooms greater opportunities.

The change from quarterly billing to continuous billing is being spread over two years; in each quarter, the readings will commence a proportionate number of days earlier, and finish a proportionate number of days later until January, 1932, when the meter reading will become automatically continuous.

On the technical side, we continue to make progress. Improvements in carbonization, purification, storage, and methods of distribution, enable us to-day to give a better service as to both quality and constancy of supply than hitherto.

Technical Progress.

Recent years have shown a marked improvement in systematic chemical control of gas manufacture in even the smallest undertaking. The new innovations in manufacture and distribution are too numerous to come within the ambit of this address. I propose, therefore, to refer only to some of the more interesting recent work in the Stretford Undertaking.

The carbonizing plant at Stretford was fully described in a paper which I had the honour to submit at the annual meeting of the Institution of Gas Engineers in 1925. It

consists entirely of horizontal retorts, but, at that time, only the extended part—one bench—of the installation had been completed, and was in operation. In the case of bench No. 3, consisting of 8 settings of 10 retorts, certain modifications were introduced—for example, the inclusion of large built-in producers to provide additional producer gas, beyond that required for heating the settings, for the purpose of diluting straight coal gas to the declared calorific value of 500 B.Th.U. per c.ft., was carried out, instead of the original proposal to install external producers.

Congdon Scrubber Standpipes.

It may be remembered that a special feature of this plant was the departure from standard practice in this country by the adoption of improved Congdon scrubber standpipes in place of ascension pipes and hydraulic mains. Six years' experience of the improved Congdon system has proved it to be very satisfactory.

The advantages of this system lie in the fact that it is possible to control accurately the pressure conditions in the retort itself to within 1/50th in. water gauge, and maintain the minimum pressure balance on the retort which is so essential to good carbonization. There is always a free, unrestricted passage for the gas from the retorts, and a considerable amount of cooling is effected in the standpipes themselves, with consequent relief to the condensing plant, and there is no labour involved in cleaning such as is necessary from time to time with ascension pipes. They are very clean in operation, and the mouthpieces and retort lids are entirely free from tar.

Retort Material.

In order to accumulate information as to the comparative efficiency, conductivity, and life of fireclay, siliceous, and silica retorts, two of the beds in No. 3 bench were equipped respectively with fireclay and siliceous retorts, and are of exactly the same design and dimensions as the other beds, which are all constructed in 95 p.ct. silica material. These two beds with one silica bed were put under fire at the same time, and have worked continuously for 1270 days, and I have recently conducted a series of tests to ascertain the comparative thermal efficiency of the settings.

The procedure in carrying out these tests was as follows: The coke was weighed, and charged cold to the producers. This naturally resulted in a lower producer efficiency than is obtained in normal working when the producers are fed with hot coke from the retorts. In order to ascertain the weight of coal, actual charges were weighed once in every charging period, and an average weight per retort was thus obtained.

Two samples of the ashes were taken at each discharge from the producers, the first immediately on leaving the ash pan, and the second as weighed. It was then possible to calculate the total weight as discharged, and obtain a fairly accurate figure for free carbon content. Combustion figures were calculated from the analysis of samples of producer gases taken at the producer arch and in the top waste gas flues.

The high temperatures, such as temperatures in the combustion chambers, the waste gases, and top flues, were taken by means of an optical pyrometer; the medium temperatures of the waste gases in the bottom flues, and secondary air in the top tubes, were taken by means of thermo-couples; and the low temperatures were taken by means of thermometers. The water leaving the ash pans was measured continuously.

The following table shows the results of tests extending over a test period of 72 hours, exclusive of the change-over period from hot to cold coke feeding which was commenced 24 hours before the actual test period:

Thermal Balance, Beds Nos. 18, 23, and 25.

(Test period, 72 hours.)

—	Bed 18. Siliceous.	Bed 23. Silica.	Bed 25. Fireclay.
Total positive heat into producer, B.Th.U.	32,287,593	29,373,044	33,589,944
Total negative heat from producer, B.Th.U.	13,586,541	12,465,024	11,853,653
Heat utilized in producer, B.Th.U.	18,701,052	16,908,020	21,736,291
Sensible heat in producer gas, B.Th.U.	16,010,000	15,410,000	18,393,333
Thermal efficiency of producer, p.ct.	85·7	91·1	84·6
Total positive heat into setting, B.Th.U.	74,747,000	67,987,900	75,371,507
Total negative heat from setting, B.Th U.	18,929,000	15,193,400	17,152,533
Heat for carbonization, B.Th.U.	55,818,000	52,794,500	58,218,974
Coal carbonized, lbs.	32,872	32,872	32,872
B.Th U per lb. coal carbonized	1,689	1,620	1,771
B.Th.U. per lb. coal carbonized (corrected)	1,668	..	1,750

It will be noted from the table that the producer efficiency in the case of silica bed No. 23 is higher than the other two beds, and this is mainly due to the fact that it is the centre bed, whereas Beds 18 and 25 are the end beds in the setting.

In order to obtain a correction for the heat lost in transmission through the end wall of beds 18 and 25, a series of tests was carried out on beds Nos. 1 and 2, both of which are of 95 p.ct. silica, and identical in construction, No. 1 being the end bed in the bench. The figures obtained bore out the results obtained in bed No. 23 silica, and the correction was found to be comparatively small, equivalent to 1·168 p.ct. of the total heat utilized for carbonization.

The corrected figures of B.Th.U. per lb. of coal carbonized show a fuel advantage in the 95 p.ct. silica setting of 2·96 p.ct. over siliceous material, and 9·3 p.ct. over fireclay. These three settings continue to be worked under similar load and working conditions, and it is hoped, in the course of the next few years, to collect some useful data as to the comparative life and maintenance charges.

Waste-Heat Recovery.

The efficiency of carbonization has been considerably improved in many undertakings during recent years by waste-heat recovery. In the Stretford Undertaking, the whole of the steam requirements of the works are provided solely from waste-heat boilers working on the horizontal settings. The waste-heat installation was described at some length in a paper read by one of my Technical Assistants, Mr. E. S. Davies, before our Junior Association, and I do not propose to describe it at length.

Briefly, it consists of two Spencer-Bonecourt waste-heat boilers, one capable of dealing with gases from 16 settings of 10 retorts, and the second capable of dealing with waste gases from 9 settings of 10 retorts; in both instances, the capacity includes up to 125 p.ct. excess air.

The carbonizing plant is built in three benches, two containing 8 beds, and one containing 9 beds, of 10 retorts, 22 ft. long, which are connected by flues with dampers at the end of each bench so that the waste gases from the whole of the carbonizing plant can be passed through one or other of the waste-heat boilers. No. 1 waste-heat boiler first installed was equipped with electric motor drive for the fan. In the case of No. 2 boiler, the motive power for the fan is an Ashworth & Parker compound high-speed piston valve steam engine; and in this instance the discharge duct from the fan is carried into the brickwork chimney. An advantage of this arrangement is that the chimney is kept warm, and should necessity arise to switch over to chimney draught the interference with the working of the settings is reduced to a minimum.

After the installation of No. 2 waste-heat boiler, it was found that there was a surplus of steam beyond the works requirements. I therefore decided to convert the original No. 1 installation to steam engine drive, carrying the discharge duct from the fan into the chimney in a similar manner to No. 2 waste-heat boiler installation.

A further advantage of carrying the discharge of the waste gases from the fan to the brickwork chimney is that the natural draught of the chimney considerably reduces the horse-power required to drive the fan. From observations on No. 1 boiler, comparing the average horse-power used in the case of the motor drive, and the average horse-power used in the new steam drive, the saving by discharging into the chimney averages from 5 to 7 horse-power, which is approximately 30 p.ct. of the total power required. Engine tests recently conducted on No. 2 boiler installation showed that the steam consumption, when working on half load—*i.e.*, 8 beds—was equivalent to 8·26 p.ct. of the total steam generated by the boiler.

The following table shows the result of an efficiency test carried out on No. 2 waste-heat boiler:

Working Tests on Waste Heat Boiler No. 2.

Duration of test	24 hours
Date of test	16th January, 1931
Retorts in operation	8 settings of 10 retorts 22 ft. long (equivalent to half load)
Temp. gases inlet superheater	932° Fahr.
,, ,, outlet boiler	394° ,,
,, saturated steam	345° ,,
Extraction efficiency	$\frac{932 - 394}{932 - 345} \times 100$ p.ct. = 91·6 p.ct.
Steam to works	70,332 lbs.
,, ,, blowers	300 ,,
,, ,, engine	5,868 ,,
	76,500 lbs.
Fuel to producers (net C. gasified)	33,260 lbs.
Steam raised per lb. of fuel	2·3 ,,
,, available	2·1 ,,
Overall efficiency	59·0 p.ct.
Net efficiency	54·2 ,,

The steam raised per lb. of carbon gasified on the producers was 2·3 lbs., or 2·1 lbs. net after allowing for the steam required to drive the fan and blowers. This quantity is sufficient to supply the normal steam requirements in most gas-works, and at Stretford the yield of steam is in excess of the present requirements.

The overall efficiency of 54 p.ct., after allowing for the steam used in operating the fan, is capable of improvement. At Stretford, however, the new retort benches were installed in an old retort house, and long brickwork connecting flues are necessary to connect to the waste-heat boilers; and as these flues are not encased or lagged the losses due to the infiltration of excess air through the brickwork, and also to convection, are considerable.

"N.O.C." Process.

The extraction efficiency of the boiler—91·6 p.ct.—is high, and there is no doubt that this efficiency, which is constant month by month, is greatly assisted by the internal and external cleanliness of the boilers. This is achieved by the "N.O.C." electrical process, which, in effect, prevents the adhesion to the boiler surface of the solid matter thrown down from the water, thus eliminating the need for scaling, and enabling a clean boiler surface to be maintained by systematic blowing down.

The apparatus consists of a small electrical generator and a control board with condensers and distributors to fractionalize the current in proportion to the particular requirements, which are based upon the size of the plant, nature of water, &c. The proper application in each individual case is based upon these known circumstances coupled with the considerable experience which has been gained in its application. The amount of current used is extremely small, and the cost of operating the process, after its first installation, is negligible.

I have found, in operation, that it is desirable to pay the closest attention to the question of concentration of the water in the boiler, as the salts, when formed, are deposited; although quite loose and apart from the boiler surface, unless the blowing-down of the boiler is sufficient to deal with the concentration, these loose salts would, in course of time, displace the water

The "N.O.C." process has had no deleterious effect on the metal of the boiler, and the report of the Insurance Company on the recent examination of No. 2 waste-heat boiler, after six months working with the process, was that there were no signs of internal corrosion whatsoever in the boiler.

Another interesting feature of this process has been its action on the fire side of the tubes. Prior to its installation, the tubes were cleaned regularly once a week on the fire side by means of hand and mechanically operated augers, as it was found impossible to keep them clean by the use of steam blowers alone. In the nine months that the process has been in operation, the tubes on No. 2 boiler have been cleaned only twice, and on both occasions the amount of deposit in the tubes was found to be less than on the previous weekly cleansings, and such deposit as has been found is only a small accumulation of dust at the outlet end of the tubes, which may be due to the eddies in the outlet chamber.

The installation of waste-heat boilers necessitating, as it does, the use of power fans for the extraction of the waste gases is in itself a great advantage in the matter of control of the working of the producers and heating of the settings, as it is possible to maintain, under all weather conditions, a constant vacuum on the main flue such as cannot be achieved by natural draught. I have found this advantage to be a measurable one so far as fuel consumption in the producers is concerned. As a point of interest, I would mention that, with full waste-heat recovery, the coke utilized on the producers is estimated at 10·4 p.ct. over a period of 12 months working, and the actual surplus coke available for sale for the year ended March 31, 1930, was 12·17 cwt. per ton of coal carbonized, the average moisture content of the coke as sold being under 5 p.ct.

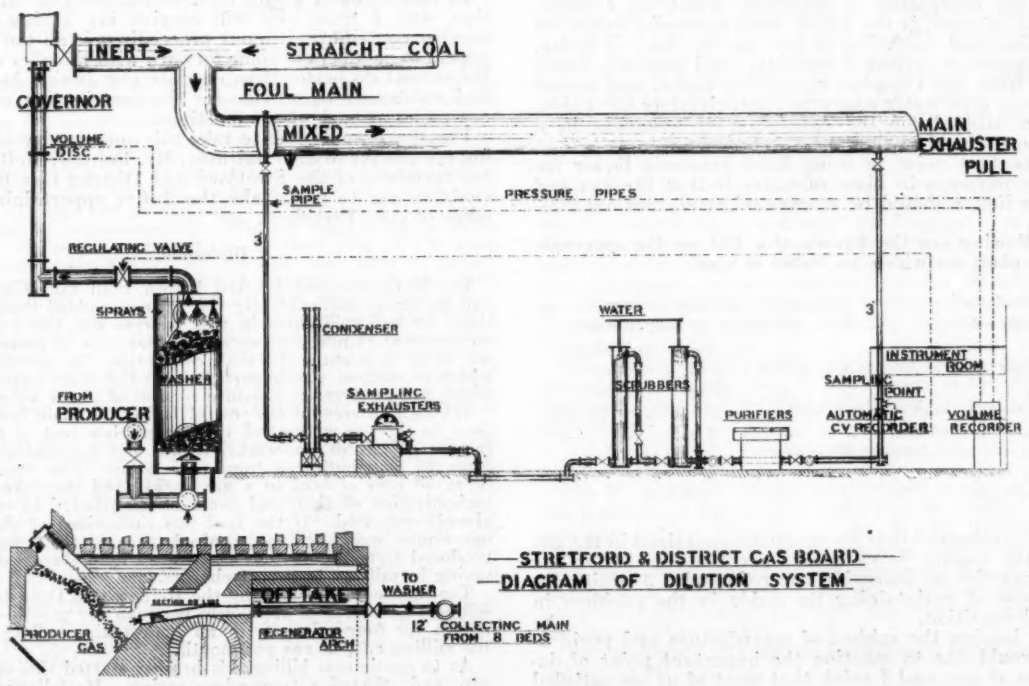
Diluting Straight Coal Gas.

The practice of taking surplus producer gas from the producers utilized for heating the settings for the purpose of diluting the straight coal gas to the declared calorific value has been in operation at Stretford for the past three years.

I previously mentioned that the producers in No. 3 bench were made larger than is required for the normal working of the settings. They are constructed on the lines commonly used in connection with vertical retort installations, and are provided with a curtain wall behind which are three gas offtake ducts, one leading to each half of the retort setting, and the third for the purpose of drawing off surplus gas required for dilution.

The duct for the surplus gas passes above the main flue, and is connected up through the flame arch to a common producer gas main, the outlet from each producer being controlled by a hot gas valve. The diagram shows the general arrangement of the plant, which is very simple. It is operated entirely by the vacuum of the coal gas exhausters at the point where the producer gas main joins the foul main leading from the retort house.

A coke filled scrubber is utilized to remove any dust carried forward in the producer gas, and also to reduce the temperature so that it does not exceed that of the coal gas in the foul main. A gas volume recorder is utilized for measuring and recording the volume of producer gas passing, and at the point of connection with the foul main a governor of the retort house governor type is used to control the volume required to give the desired calorific value. Experiments have been, and are still being, carried out in automatic control, and the plant for the purpose of these experiments is shown on the diagram. Time will not permit of my describing this in detail. Good progress has been made in the matter of overcoming the principal difficulty in the automatic control of mixed crude gases—*i.e.*, the time lag factor—and I hope that I may have an opportunity, at a later date, of again referring to this matter.



—STRETFORD & DISTRICT GAS BOARD—
—DIAGRAM OF DILUTION SYSTEM—

The control is at present being carried out by hand loading of the retort house governor, and, with experience, our foremen are able to maintain a constant mixed gas to within 2 p.ct. of our declared calorific value.

In normal working, to allow for the use of air for revivification *in situ*, the mixed crude gas is maintained at from 505 to 510 B.Th.U. gross. The effect of the addition of producer gas to the crude coal gas is shown in the following table giving the analysis of continuous samples taken over a period of 6 hours 50 minutes.

Analyses of Straight Coal Gas Producer Gas, and Crude Mixed Gas. to show the effect of the use of Producer Gas from Retort Settings for Dilution.

Continuous samples taken over period of test

Period of test	12.30 a.m. to 7.20 a.m.
Coal gas made	699,100 c.ft.
Producer gas added	41,900 ,,
Total mixed gas	741,000 ,,

Analysis.	Crude Coal Gas.	Producer Gas.	Crude Mixed Gas.
CO_2	2·5	6·4	3·3
O_2	0·3	0·5	0·4
C_nH_m	3·1	..	2·8
CO	8·2	22·1	8·4
CH_4	26·5	..	25·7
H_2	51·1	5·8	50·7
N_2	8·3	65·2	8·7
Density	0·414	0·943	0·426
Calorific value	523·7	90·2	508·3

It will be noted that the volume of producer gas utilized in the period in which the test was carried out was comparatively small, being only 5·6 p.ct. of the coal gas volume. The quality of coal gas was itself comparatively low, being 523·7 B.Th.U. (gross) average. This is due to the circumstance of carbonizing by 8-hour charges with a 4-hour break between charging periods. Taking an extended period, the quantity of producer gas utilized for dilution is from 12 p.ct. to 15 p.ct. by volume of the straight coal gas.

The analyses given in the table are interesting in that they show the effect of the producer gas dilution on the CO_2 and O_2 content; also the specific gravity. The average inert content of the mixed town gas is under 12 p.ct. and oxygen is maintained at approximately 0·4 p.ct.

The use of producer gas as a diluent in this manner has the advantage of extremely low cost; no additional wages are required beyond the normal retort house wages, and the average cost of coke used in its manufacture last year amounted to 2·1d. per therm of producer gas, or 1·98d. per 1000 c.ft.

Fixed Ammonia for Scrubbing Coal Gas.

A further innovation at Stretford, which is, I think, of general interest, is the use of fixed ammonia liquor for the washing and scrubbing of coal gas in place of water. Under the present system of working, fixed ammonia liquor is taken from the Congdon separating tanks, and cooled in a Holmes type water cooler to approximately 60° Fahr., and then utilized for the extraction of ammonia in a D. & L. centrifugal washer.

An important point in using fixed ammonia liquor for scrubbing purposes in place of water is that the gas and scrubbing liquor should be at approximately normal temperature.

The following are the figures of a test on the ammonia recovery plant on which no water is used:

Gas volume	87,000 c.ft. per hour (average)		
Liquor volume	180 gallons per hour (average)		
		Ozs., Free.	Ozs., Total.
Liquor strengths, inlet D. & L. washer		0·62 ..	7·09
,, ,, outlet ,, ,,		6·23 ..	14·10
Grains NH_3, inlet to D. & L. washer	156·8 grns. per 100 c.ft.		
,, ,, outlet ,, ,, ,,	5·9 ,, ,, ,, ,,		
Liquor temp. inlet to D. & L. washer	58° Fahr.		
Gas ,, ,, ,, ,, ,,	58° ,,		
CO_2 in gas ,, ,, ,, ,,	2·8 p.ct.		

It will be observed that the ammonia contained in the gas leaving the washer is 5·9 grains per 100 c.ft. It is our normal practice to leave in, approximately, 5 grains for the purpose of maintaining the oxide in the purifiers in a neutral condition.

Before leaving the subject of manufacture and purification, I would like to mention the important point of dehydration of gas; and I think that most of us are satisfied that this is to-day an essential purification process which should be carried out in every gas undertaking.

There are many interesting developments in distribution practice, such as distance pressure control, automatic high-pressure storage, &c., which are being developed to achieve the main desideratum of constancy of pressure throughout an area of supply, irrespective of the distance from the gas-works and the variation in the rate of demand.

Marketing of Coke.

The sale and marketing of residual products more than ever demands the careful consideration of all responsible officers. It is essential that first attention should be paid to quality of coke, and I have found that the cost of laboratory work in the careful selection, checking, and analyzing of coals as delivered, coupled with proper blending for carbonization, is more than repaid in the value received for the better quality of coke produced. In all works the regular and frequent analysis of the coke should be systematically arranged in relation to the quantity produced, as, without this, no systematic sales campaign can be put into force that will bear fruitful results.

In the Stretford Undertaking a salesman is employed whose time is almost entirely devoted to the sale and marketing of coke, and in attending to service to the buyers; and as a result of his salesmanship, coupled with careful attention to quality, we have had no difficulty in disposing of the whole of our production of coke within our own area during the past five years.

The world wide depression in tar products is reflected in the reduced value of crude tar. This circumstance has fortunately caused both gas undertakings and tar distillers to pay closer attention to the preparation of road tar. In this connection, I would refer to the valuable work of the British Road Tar Association, both in propaganda and in technical research, which has done so much to counteract the damage done in the past by the indiscriminate supply and use of crude tar, and improperly prepared tar, for the dressing of roads.

Co-operative Tar Schemes.

The formation of co-operative tar schemes has enabled us as producers to take an active part, in co-operation with the distillers, in the distillation and selling of our tar, and it has been found possible to centralize and arrange the distribution of crude tars from coke ovens, and horizontal and vertical retorts, to obtain the best mixtures for the preparation of road tar. A further advantage lies in the economies resulting from the centralization of the manufacture of tar acids and water-white products in one works as distinct from numerous small and costly plants.

The co-operation between the various gas undertakings and the distillers, who have had a life-long experience in the distillation of tar, and chemical preparation of its products, produces, with a mutuality of interest, a combination with such resources in the manufacture of, and even more particularly upon the marketing of, products which could never be built up by a single gas undertaking.

In conclusion, I would refer to the work of our Institution, and I trust you will forgive my saying that the number contributing to our proceedings is all too small. I appeal to members to come forward with the offer of papers. We cannot do better than emulate our Junior Association, and endeavour to provide for the contribution of at least one paper at each of our meetings.

Finally, I would like to take this opportunity of expressing my thanks to my Chairman, Mr. Robt. J. McBeath, and the members of the Stretford and District Gas Board, for enabling me to undertake the duties appertaining to the office of your President.

Discussion.

Mr. McLusky said he had known both Col. Carr's father and his uncle, and evidently Col. Carr resembled them. Everything he had told them in this address was the result of an achievement in practical work. He was able to make coke and sell it at a profit. In that connection the question of the moisture content was important, and Col. Carr produced coke which had an average moisture content of under 5 p.ct.

Taking into account the cost of laying the main from the colliery to the gas-works and the present low cost of the manufacture of gas in gas-works, it was not economical in many cases to distribute gas from coke ovens. One wagon would bring 10 tons of coal to a gas-works, and the coke from the carbonization of that coal could be distributed in the market already prepared. If the coal was carbonized at the colliery, one wagon would still be required to carry the 5 tons of coke produced from the 10 tons of coal, so that there would be no saving in railway transport charges.

The salesmen employed by the Halifax Gas Department were selling £250 worth of appliances per man per month—£1000 per month for four salesmen in an undertaking selling less than 100 million c.ft. of gas per month.

As to continuous billing, his brother started this many years ago, and effected a tremendous saving. He followed that ex-

ample. There were over 30,000 accounts to deal with, and unless they were well distributed a very big place would be required for the purpose. But now 400 accounts went out every day, and 400 people paid every day. Incidentally they reduced the number of inspectors of ordinary meters from 14 to 4, and work was found for the ten displaced until the time for retirement arrived. No change was made in the number of slot meter inspectors.

The Gas Engineer at Halifax, Nova Scotia, had told him of the tremendous advantages derived from the use of the Congdon system. One advantage was the reduction in the sulphur content of the gas. After experimenting for eight years, it was brought to as low as 9 grains in the summer and 12 grains in the winter by treating the hot gas with liquor at the proper temperature.

Col. Carr's waste heat recovery was remarkable. It was surprising that after passing the waste heat through the regenerators he was able to recover so much in the boilers. Of course, there was the further advantage that he did not need steam for his retorts, and, therefore, the steam generated by the waste heat was sufficient for his purpose.

It was much easier to get long life in continuous vertical retorts than in horizontal retorts. At Halifax they installed vertical retorts ten years ago, and they had been renewed once only. He could confirm what Mr. Carr had stated about the rapid transmission of heat through the wall of the silica bed. They had known that the transmission was more rapid, but they were amazed to find the increase in output was much in excess of the 20 p.ct. which they had expected.

Coke Oven Gas.

Mr. C. S. Shapley (Leeds) said the subject of coke oven gas interested him very much. In connection with several points which had to be borne in mind, one had to remember the deterioration which took place. Then there was no saving in the cost of carriage. This had to be paid upon the coke instead of upon the original coal, and the coke was of greater bulk. Another very important point was this. Suppose contracts were made for fifteen years. At the end of that time, when they desired to renew the contracts, if they were told, "No, we will make our own gas," what was the position then? What was going to happen to the coke market which had been built up? It should be made clear that gas undertakings could get coal from the colliery and return gas at a cheaper rate than it could be made at the colliery.

Mr. A. L. Jennings (Cleckheaton) pointed out that in the address the cost of the coke used in the manufacture of producer gas was stated to be 2·1d. per therm. He did not see how that harmonized with the figures in the table showing the comparative cost of gas into holder.

Mr. R. E. Gibson (Liverpool), in proposing a vote of thanks to the President for his address, said the name of Carr was famous in the Gas Industry, and Col. Carr was adding to the lustre of it. It was not easy to find something new to say in a Presidential Address. Col. Carr had done so, and he had dealt with some vital matters of which he had made a special study. The members would benefit by his experience. In Liverpool water gas was used for the dilution of coal gas; and he would be very much interested in comparing that method with the system employed at Stretford.

Mr. G. Dixon (Lancaster) said that in the course of the address points cropped up which everyone must have felt were valuable for reference, and points on which they would like further information. The Gas Industry was in a peculiar position to-day. They needed strong men, and Col. Carr was a strong man.

The President's Reply.

The President said he appreciated very much the cordial way in which the members had received the address; it amply repaid him for his trouble. Mr. McLusky raised the question of the moisture in coke. He thought he was as much alive as anybody to the necessity for having the driest possible coke, and for that reason they at Stretford were very careful about the quenching. The coke was quenched on an open bench, and the work was done not automatically by machine, but by hand, so there was no over-quenching. When it went to the breakers the centre of the coke was red hot, so they were able to keep the moisture within 5 p.ct. At one time they used to quench by immersion; it was very difficult then to keep the moisture content below 15 p.ct. Undoubtedly they were getting a very good coke figure largely by reason of the fact that there was a very good regenerative capacity. He thought they were getting the maximum recovery in the regenerators. The temperature of the gases entering the waste-heat boilers showed that they were getting as much as possible out of those gases before utilizing them for the recovery of waste heat in the form of steam.

He agreed they should not rely upon maintenance men and fitters as the main selling agents. The object of giving them commission was to get some advantage out of them, and make them realize that the sales of the undertaking were as much their concern as anybody else's. But he did not suggest that the utilization in that way of the fitters, maintenance men, and inspectors in consumers' houses should displace or replace the primary essential in every gas undertaking—a first-class selling staff.

It was interesting to hear that Mr. McLusky had got in front of him in the introduction of continuous billing, and that it was a success. He was satisfied now that he had done the right thing in deciding to introduce it at Stretford.

With regard to the question of reduction of sulphur content, they had done some work on that; and though he was not prepared to give any figures at the moment, he would endeavour to arrange for some information to be given at a later meeting.

There was a question as to the amount of steam used in the works. They did not use it in the retorts; otherwise the demand was probably equal to that of any other works. They had a large number of pumps—probably more than most works—because of the pumps required to keep the liquor in constant circulation. They also utilized steam for the gas for high-pressure distribution.

Mr. McLusky's remarks on the life of vertical retorts as compared with horizontal retorts were interesting. He was hoping to get in the next few years some indication of what advantage was obtained by having a curtain wall, which prevented some of the dust being carried into the setting which was carried in where the producer communicated directly with the flame arch of the combustion chamber. From observations, limited so far to No. 3 bench, he thought it could be shown that the effect of sending cleaner gas into the setting would give a longer life than was previously experienced when the producer gas was taken straight into the flame arch of the combustion chamber.

Mr. Shapley raised a point in connection with coke oven gas which he omitted from the address. He felt that his space was somewhat limited, and he wanted to stress the most important points—that in their own works they could do better than by buying coke oven gas. As Mr. Shapley rightly pointed out, there was no saving in carriage, because carriage had to be paid on the coke, the bulk of which was actually greater than that of the original coal if brought from the colliery to the gas-works.

Mr. Jennings referred to the question of the relative cost of straight coal gas and producer gas. In the 2·1d. per therm given there were no additional wages for the manufacture of that producer gas. No appreciable difference was made to the maintenance cost. Although the producer was a few inches wider and a few inches deeper, the fact of taking that surplus producer gas for dilution purposes did not increase measurably any maintenance cost upon the plant. In the table referred to the net cost of coal gas was 4·7d. per 1000 c.ft., which was just under 1d. per therm for 500 gas; but on the top of this he must put 2·06d. for wages and 3·44d. for repairs and maintenance. Therefore, there was not very much difference in cost between producer gas and straight coal gas; but it paid to use producer gas because of that saving in wages, repairs, and maintenance. Although they had a water gas plant, it paid them to allow it to stand idle. It was maintained for emergencies such as failure of the coal supply, of which they had experience during the coal stoppage of 1927.

He thanked Mr. Gibson for his kind remarks. He felt he had achieved something in being able to excite interest in this question of the dilution of gas. Of course, the matter was open to considerable argument, and he did not wish to dogmatize as to relative values; but he could say what had been found beneficial in Stretford so far as the use of producer gas instead of water gas was concerned. He felt that in many small works where there were horizontal settings, and they were going to supply gas with a calorific value of 500, producer gas could be used to dilute the coal gas down to 500 instead of doing what had been done for years, but was known to be extremely bad practice, from the point of view of the life of the setting, the quality of the gas, and everything else—over-pulling the retorts.

The Death of Alderman F. S. Phillips.

The President said he was sure the members would not like the meeting to conclude without expressing their regret at the death of Alderman F. S. Phillips, who had been a tower of strength in the Industry for many years. He would be sadly missed as a friend and a help to everybody connected with the Gas Industry. His heart and soul were in it, and his ability made him a great power for good.

The members rose, and stood in silence for a short time.

Invitation from the Stretford Gas Committee.

Mr. R. J. McBeath, Chairman of the Stretford Gas Committee, invited the members to visit the Stretford Gas-Works, inspect them, and enjoy the hospitality of the Stretford Gas Board. He remarked that the Board was not an ancient authority. It came into being in October, 1922, and purchased the undertaking from the Manchester Corporation. Since that time the whole works had been reorganized, at a cost of £220,000, by Col. Carr, their Engineer.

The President, on behalf of the members, accepted the invitation. Friday, July 3, was chosen as the date for the summer meeting of the Institution and the visit to Stretford.

Vote of Thanks.

Mr. G. S. Smith (Runcorn) proposed a vote of thanks to the Committee and to the Secretary, Mr. Bridge, for their services during the year. Mr. E. H. Hudson (Normanton), in seconding the resolution, said that the members had good reason to congratulate Mr. Smith upon having had a good year, but Mr. Smith could not have done so much without the loyal and hearty support of the Officers and Committee.

The resolution was passed unanimously, and was acknowledged by Mr. Bridge.

London and Southern District Junior Gas Association

Exhibition of Films on the Manufacture of Gas Plant

A Meeting of the London and Southern District Junior Gas Association was held at the Westminster Technical Institute on Feb. 27, 1931, the technical proceedings consisting of an exhibition of two cinematograph films showing the design, manufacture, erection, and testing of the gas-works, and bye-product plant of Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, and of their well-known "Connersville" meters, exhausters, and boosters.

Mr. T. H. PRATER, of Margate, the President, occupied the chair, and, at the outset, commented on the value of these instructional films in providing facilities for bringing to the notice of engineers and technical institutions the research and constructional work carried out by contractors to the Industry.

During the course of the exhibition the films were described by Mr. S. G. Watson, the London and District Representative of Messrs. W. C. Holmes & Co.

There were a number of detailed photographs of the internal construction of such apparatus as tar extractors and rotary washers, in addition to those of "Connersville" meters, exhausters, and boosters, which should prove of great value to those entrusted with the repair and maintenance of gas-works plant. There was included also a short section dealing with the principles and advantages of gas dehydration as carried out in Messrs. W. C. Holmes & Co.'s "Dri-Gas" process, including photographs of consumers' meters used on wet and dry gas respectively, and a sectional illustration of the formation of stoppages in gas mains and services, due to the deposition of water and naphthalene.

Discussion.

The PRESIDENT, opening the discussion, said that a large field of works plant had been covered, and they had all been impressed by the extreme accuracy which was observed in the manufacture of the "Connersville" meters and blowers. One of the blowers which was shown in the film in course of manufacture was now in operation at his own works at Margate, and was the first "Connersville" positive blower to be used on a water gas plant in this country. One of the great advantages of this positive type of blower, and, indeed, one which was particularly evidenced in his own case, was that it enabled them to use a low-grade fuel in their water gas plant, and thus conserve the larger and more saleable coke for marketing purposes. In their water gas plant they used fuel under ¾ in., and with the ordinary type of centrifugal fan it would be practically impossible to gasify such fuel owing to the high back pressure. This "Connersville" blower, however, gave them a pressure of 34 in. W.G., and would, indeed, give them sufficient pressure to gasify almost any kind of fuel. Mr. Prater stated also that after the equivalent of three months' continuous operation this blower was inspected and the internal clearances checked. They found that these clearances were almost identical when the blower was first put into operation, which he considered confirmed the precision of the machining and erection and the general sturdiness in design that they had seen depicted in the films.

Mr. HAWES (Tottenham) asked if it were possible for "Connersville" meters to be checked *in situ*, or was the construction such that once it had been tested it would be accurate for all time.

Mr. WATSON replied that the testing of any type of large meter at anywhere near its rated capacity was a very difficult problem, and, indeed, a very vexed question. For instance, the standard method of testing a wet drum meter was by means of a 100-light test meter, which, in the case of a large station meter, while it gave an assurance that the drum was sound, was not an indication of the accuracy of the meter when working at its rated capacity and under conditions obviously different from those of the test. With regard to the "Connersville" meter, the internal construction was throughout of cast-iron, and therefore not corroded by ordinary crude or purified coal gas. As there were no internal parts in contact these parts could not wear, and the internal dimensions were unchangeable. The displacement of the meter was, therefore, substantially unchangeable, with the exception of the slip, which was less than 1 p.ct.—usually about 0·8 p.ct.; so the testing of the meter *in situ* consisted of determining whether the slip was the same as when the meter was tested before dispatch from the works. The slip was determined *in situ* by two methods—first, by rotating the impellers against a closed inlet or outlet valve, the number of revolutions necessary to produce a given pressure rise between the impellers and the closed valve being an indication of the slip at that particular differential pressure when the meter was working. The second, and more difficult method of slip determination, was to connect the meter in series with a 100-light test meter, and to determine the amount of gas that would pass the impellers at a series of different differential pressures. For each differential pressure this determination should be made with the impellers at a number of points throughout 360 degrees—(say) in 90 or 180 different positions—and the result averaged. From these two methods a curve for slip against differential pressure could be plotted and compared with the original curve made at the test before dispatch from the works.

Lubrication of Exhausters and Meters.

Mr. F. H. HIGTON (East Surrey) said that if two "Connersville" exhausters were installed in parallel, and one not used continuously, would it be necessary to inspect this exhauster and to use a special lubricant in order to prevent the clearances between the impellers being blocked by gum or tar?

Mr. WATSON said that in the case of an exhauster not in work for a considerable time, they recommended that (say) once per fortnight some naphtha or gas oil should be poured on to the impellers and the exhauster turned over to see that the internal parts were free. Where two exhausters were installed, one as stand-by, they would probably adopt the practice of running each exhauster for a week at a time, in which circumstances internal lubrication would be unnecessary.

Mr. H. WADSWORTH, B.Sc. (Tottenham), said they had two "Connersville" meters in parallel at Tottenham, and had had experience of one of these meters gumming up and most of the gas passing through the other meter. This they had remedied by arranging a drip-feed of paraffin to both meters, the feed being only about one drop every two seconds, but which kept the deposits soft and prevented either meter from blocking. He asked if Mr. Watson had experienced brush deterioration due to defect of calcium chloride in the drying plants.

Mr. WATSON replied that they had no cases of brush deterioration reported to them. The first drying plant had been working at the Taunton Gas-Works for four-and-a-half years. The brushes were examined specifically for deterioration after two-and-a-half years' working, but they were found to be quite satisfactory, and he believed that they were still in good condition. There appeared to be no theoretical grounds for anticipating that calcium chloride solution would be destructive to these brushes.

Mr. S. H. MILES (Reading) asked for details of the lubrication of "Connersville" meters. Referring to the Holmes brush washer, he described difficulties he had experienced owing to deposits on the brushes in the water inlet section of an ammonia washer, presumably due to the hard water used. He asked whether Messrs. Holmes were carrying out any investigations on wet purification processes for H_2S recovery, as, for instance, on the lines of the plant at Stockport. Such processes were in use in America, but he believed that some of the more efficient of these processes relied upon H_2S being blown into the air, which was forbidden in England.

Mr. WATSON said that the only two parts requiring lubrication in "Connersville" meters were the gears and bearings. The gears ran continuously in an oil bath, and the bearings on all meters of a capacity greater than 300,000 c.ft. of gas per day were lubricated by a grease gun. Special oils and greases were recommended and could be obtained from the ordinary oil companies. Cases where calcium carbonate had been deposited in the last section of ammonia washers had been reported to them, and the most satisfactory remedy was to use softened water or cooled ammonia liquor in the washer. Relief could also be obtained by omitting brushes from the water inlet section and fitting distributors to the brush plate, using this section as a water softener, softening the water by the last traces of ammonia in the gas. Calcium carbonate deposits would then settle out into the tar box at the bottom of the section and could be run away as a sludge.

Sulphuretted Hydrogen Removal.

Mr. Watson went on to say that he had studied the question of liquid purification for H_2S removal during his recent visit to America, but was of the opinion that several factors made it either uneconomical or precluded its use under English conditions. Most of the processes he had studied had disadvantages such as relying on discharging H_2S or SO_2 into the atmosphere in large quantities or producing a toxic effluent not easy of disposal, or requiring comparatively high operating costs, and under English conditions, where the method of testing for H_2S was very stringent, would need a large area of catch boxes. Generally, the processes such as the "Seaboard," "Ferrox," and "Thylox," which he had studied closely, could not be shown to be economical or of advantage in England at present.

Mr. TUNSTALL (Tottenham) asked if anyone had found means of avoiding trouble due to the deposition of calcium carbonate in calcium chloride solutions in gas-drying plants when ammonia was present in the gas. He had found that in his case the replacement of calcium chloride where these deposits occurred represented a cost of 3d. per million c.ft. of gas treated, apart from the inconvenience of removing the sludge.

Mr. WATSON replied that they were investigating this subject, but, at present, their attitude was that the cost of replacement of calcium chloride under these circumstances, was negligible. As stated by Mr. Tunstall, it represented only 0·003d. per 1000 c.ft. of gas treated, which was a negligible item in the total operating cost, which itself was usually between only 0·1d. and 0·2d. per 1000 c.ft. of gas. Of the 40 to 45 plants in operation at the present time, only four had reported serious trouble due to calcium carbonate deposits in the calcium chloride

solution caused by ammonia in the gas entering the drying plant.

Mr. MARTLEW referred to the use of cycloidal teeth instead of the customary machined involute teeth in the "Connersville" products.

Mr. WATSON remarked that in the case of the "Connersville" meter, where it was necessary to have a minimum of friction and where the load on the gear teeth was very small, in view of the low differential pressure at which the meter operated, it was their practice to use involute teeth of the Maag form, which gave a minimum surface contact in the gear teeth. For boosters and exhausters, where the load was heavy and strength was required, it was of advantage to have a wide bearing surface in the gear teeth. They, therefore, used epi-cycloidal teeth formed by generating circle of half the diameter of the pitch circle which gave a tooth with a maximum surface on the line of contact, and gave a gear as strong as possible.

VOTE OF THANKS.

Mr. A. TENNANT (East Surrey), the Junior Vice-President, in proposing a very hearty vote of thanks to Mr. Watson, said they had been well repaid for their attendance that night. It had been a unique experience to have a meeting of this sort on their programme. They were used to visiting works, but on this occasion the works had been brought to them, and in this respect the meeting was unique. He would like to mention one point that had made itself manifest that night, and that was the question of co-operation between the manufacturers and the Gas Industry. The Industry owed a lot to the manufacturers of their plant and appliances, and Messrs. W. C. Holmes had shown them what they were doing to help the Industry in the manufacture and distribution of gas. They must congratulate themselves upon having Mr. Watson there on that occasion; many would remember when he previously lectured to them on his experiences in America. His intimate knowledge of gas-works practice was always available to associations of this kind, and they were very indebted to him.

Mr. W. T. KENSHOLE (Lea Bridge), in seconding the vote of thanks, endorsed what the previous speaker had said, and commended Mr. Watson upon the extremely able manner in which he had dealt with the subject and the discussion.

Mr. WATSON, acknowledging the vote of thanks, thanked the Association for the way in which they had received the films. He found as a rule that films were rather difficult to discuss, but on this occasion they brought forth one of the best discussions he had had. He would like to thank the Association on behalf of the Directors of Messrs. W. C. Holmes & Co., Ltd., for giving him the opportunity of showing what the firm were doing.

In conclusion, Mr. Watson mentioned the fact that there were two copies of these films in sizes suitable for a portable projector, and the firm would be only too pleased to make arrangements to loan them to anyone interested.

Petrographic Treatment of Coal

Mechanical Separation of Coal into its Constituents and their Commercial Applications

By JOHN L. STREVENS

[From a Paper before the Institute of Fuel]

(*Concluded from p. 585.*)

COSTS AND RETURNS.

These are determined by the conditions obtaining for the particular coal under consideration.

The prices obtainable for the separated products will depend on their value to the consumer as raw material over ordinary washed fine coal. The Glanz coal fraction comes from the process dry, small, but dust free and poor in Matt and Faser coal constituents. Because, however, of its excellent coking properties and possibilities of blending with raw coals in the coking industry, as well as the higher yield of bye-products by virtue of its altered volatile matter, it should command higher prices than raw coal.

Many coking concerns will welcome this material, as it renders superfluous the necessity for crushing their large coal or nuts, while the advantages of coking coal that is relatively low in moisture on the economics of the installation are evident.

For the Matt coal, especially that from the younger and high volatile coals, with its condition suitable for hydrogenation, distilling, or gas coal blending, little need be said. There will undoubtedly be an ever growing demand for this substance, when available commercially, from major gas undertakings, low-temperature carbonization works, and coal oil producers generally.

The fusain appears to be eminently adapted for dust firing in the condition it is separated, and its utilization as such would certainly effect economies in the milling costs compared to those when using direct r.o.m. to small coal. Unless its ash content is absolutely prohibitive it should also find an outlet in the preparation of colloidal fuel, which, to be successfully taken up, must have as its basis cheap soft coal. Fusain separation from coal designated for briquetting is important, as thereby better briquettes are obtained and economy is effected in "binder" required.

An ideal and also feasible manner to carry out such coal treatment would be the installation, on selected coal fields at strategic and freight favourable points, by an association of those directly interested in all coal products, of large central plants in which only coal over 30 mm. would be sent to the percussion plant. Under 30 mm. would be used on the spot for heat and power purposes.

Associated mineral matter would be hand picked from the larger material before sending it to the percussion mills. The Glanz coal would go to the coke ovens, the Matt coal to the coal-oil and gas interests, and where excess coke residuum was obtained this would, of course, be an ideal material for water gas generation. Fusain would be sent direct to the powdered fuel burning plant or loaded into the tank wagons that will ultimately be used for its transport.

Should the ash content in the coal be still high after separating under 30 mm. material and hand picking before elastic percussion treatment, a dry cleaning process should be interposed.

COSTS OF COAL PREPARATION.

Until a few years ago coal preparation (apart from mere grading) was carried out exclusively by wet mechanical means. In recent years dry cleaning chiefly by air separation has come into prominence. In many existing coal machines using wet processes the total washing costs range from 80 pfennigs to 1·2 marks per ton according to the process and throughput. In the more modern plants that are thoroughly mechanized these costs may be as low as 0·55 mark per ton. Owing to the extremely high capital cost of the plants, often as high as £450 per hourly ton of coal treated, the capital charges may amount to 70 p.ct. of the total, leaving a very small figure to cover the actual working expenses. The total all-in costs for flotation processes are round about 0·9 mark per ton, including filtration. Plant and buildings for dry cleaning are considerably cheaper than for wet processes, so that installation costs as low as £250 per hourly ton of coal treated are not unusual. With such plants the all-in costs may be as low as 0·43 mark the ton treated.

A difficulty in the subject of investigating small coal microscopically by thin sections to determine composition as developed in England has been overcome by Stach and Kuhlwein who have developed a method of examination in polished relief surfaces containing minute coal particles that has later been successfully applied to regular quantitative coal petrographic analysis. Investigation of fine particles on thin sections has proved impracticable so that examination of our English coals along these new lines developed by Stach and his co-workers will not only break fresh ground but give us a ready means of following by the microscope the course of research in the behaviour of our coals to elastic percussion treatment. A start has already been made by Needham at Birmingham and great interest evoked.

Briefly surveying our present knowledge of the petrographic constituents of certain major English coal seams, in Durham the Glanz coal fractions are extremely rich in vitrain; hence the high quality of Durham metallurgical coke. In Scotland and Yorkshire the seams are associated with much clarain, and as the bulk of the durain is here separated in the hard lump coal, the clarain influences the

coking properties of the coals also. The Barnsley (Yorks) seam is vitrain-poor compared with the Parkgate. Here the durain forms everywhere the large portions so that considerations for improving the coking qualities of this coal are predominantly bound up with the clarain portion poor in vitrain.

From a strictly national point of view it is a waste of part of our resources to apply directly as fuel the more valuable coal constituents especially from the younger and less in-carbonized (high volatile) measures. Except in certain limited cases, fusain is disadvantageous in distillation, coking, hydrogenation, and gas manufacture. As a powdered fuel it may require further dressing to free it from inherent ash, but then, on account of its inert nature and high calorific value, it would be a perfect combustible not only in powdered fuel burners for direct steam raising but in the Diesel engine, directly injected on the Pawlakowski system. Even if sufficient coal were annually treated along petrographic lines to satisfy the requirements of the major gas and coke undertakings of this country, all the residual fusain would still have sufficient channels of absorption, so that no fears of its being a drug on the market need be entertained.

It is also highly probable that combinations of lesser interests working on individual coal seams in a disjointed and small way could send their several raw materials to a central plant favourably situated for vending the separated products much in the same way as crude petroleum from the producing fields goes crude to the refinery whether such is central or at tide-water.

To those countries deficient in high-grade bituminous and coking coals, but rich in the younger and higher volatile poor to non-caking coals, petrographic treatment should particularly appeal. Here it should be possible to purchase cheap r.o.m. coal, which is the least subject to fluctuating market conditions, and therefore capable of being purchased on long dated contracts, and work it up into products of value. Thus both Canada and South Africa could ultimately expect to produce from their own coals all the gas coal they need and vitrains sufficiently rich in coke forming constituents to yield a utilizable smelting coke. By its adoption on a wide scale it is not a fantastic picture to visualize the centres of gravity of the coal industry shifting as deposits suitable for such treatment are opened up, besides the throwing of a lesser strain on the known good coking coal deposits and giving them a longer life irrespective of the rate of growth of the steel industry.

Of the total coal used in Great Britain, the following table shows its distribution taking an average year basis (1925):

	P.Ct.
To Gas-works	10
Railway locomotives	8
Iron and steel works	12
Collieries themselves	9
Domestic	24
General manufacturing	31
Power stations	5
Coastal vessels	1
	100

This unwieldy table could be better balanced by substituting some amount of the domestic and railway requirements with fuel prepared from petrographically separated coal. Much of that used at the collieries could also be displaced by fusain and doubtless other possibilities would present themselves as the treatment gained ground.

Transport.

How will the fine coal material be transported? This is naturally the first question asked by coal interests seized with the advantages of taking up the petrographic separation of coal commercially. Obviously collier transport for export or rough coastal trade would have to be revolutionized before vitrain and durain could be shipped without danger of "banking" (should its angle of rest be so very much different from that of lump coal), and existing coal handling appliances would require a great deal of modification. Possibly pumping for charging and discharging would be an advantage. As both these materials when sent from the treatment plant would be comparatively free from dust, dust troubles would not be serious, even if a small percentage developed from the softer vitrain in transit. The solution may be in the building of special coal carrying vessels of suitable construction on lines similar to those adopted by the bulk grain carriers. On land, tight and large wagons will be essential. For the fusain the transport facilities will develop along the lines being evolved for powdered fuel—*i.e.*, in tanks and steel drums.

Conclusion.

The technical separation of coal into vitrain, clarain, durain, and fusain is, as this paper shows, possible by elastic percussion, and the methods worked out are simple and economically sound. It is best achieved in pendulum mills in association with preliminary dry dressing where the ash content of coal is high.

The vitrain fraction is best adapted for coke manufacture.

The clarain-durain fraction is best adapted for retorting, gas-manufacture, hydrogenation, and for blending with gas poor and highly swelling coals, also as raw material for low-temperature cokes.

The fusain can be directly applied for powdered fuel firing or as a raw material for colloidal fuel.

That the subject is being taken seriously in Germany may be gauged from the fact that a number of the leading coal dressing plant concerns, in combination with the Ruhr associated mining interests, have definitely adopted petrographic separation on the Lehmann principles, and, with the experience gained from the testing of hundreds of tons of various German coals in the pilot plant at Brassert, will construct plants at various strategic centres for the treatment of these coals. For British coals, the pilot stage has yet to be passed through, and doubtless with clarain-rich coals certain modifications of the treatment will be necessary. Petrographic separation, especially for those of our Dominions where the coals are associated with cannels and torbanites, brings nearer the stage of economic production of oil from solid carbonaceous material. For countries poor in coking coals it opens a way to produce cokeable material from such deposits by removal of durain. Durain itself, being a valuable raw material for gas producers, and oil producers, as well as having certain other uses in "blending" for coking purposes, is not likely to lack ever increasing markets, while fusain will always be considered as a bye-product.

Discussion.

The Chairman (Mr. A. H. Lymn) said he noticed in the paper that vitrain, durain, and fusain were spoken of in Germany as Glanz Kohle, Matt Kohle, and Faser Kohle. It seemed to him that the English equivalents, bright coal, dull coal, and fibrous coal, were very much simpler expressions than those commonly used in this country. He noticed also that clarain was ignored by the Germans, although the author had referred to the fact that clarain was contained in German coal. The author made the remark that fusain was an indifferent solid carbonaceous body of all distillation processes, so that (with no exception) it was harmful to all coal treatment processes. But Mr. C. P. Finn in a recent paper claimed to have improved his coke remarkably by blending fusain with the coal. Some remarks by Dr. Foxwell in the discussion on that particular paper were of interest. Dr. Foxwell said: "One important question not settled in the paper, and which, of course, the author had not set out to settle, was the question of whether the vitrain from one seam was identical with the vitrain from another." He believed that certain scientific workers in this direction claimed that the vitrain was more or less the same in different seams. That point would be interesting to elucidate. Of course, it was well known that the general blending plant was a very crude affair indeed. Any coals were taken just as they came in, and mixed mechanically. But if it were possible to separate those component parts which were valuable for each particular branch of the coke treating industry before blending took place, and then to blend according to certain figures of the respective compositions, one would have something much better on which to rely; and probably, if such a plant could be built commercially, there would be a far better commercial result from the coals. Undoubtedly the situation which the author had described towards the end of the paper was an ideal one, but one was led to ask whether it was commercially possible. It seemed to foreshadow, at all events, first a dry cleaning plant (and they all knew that this was a very costly proposition), and, secondly, a petrographic plant, which appeared also to be very costly. Unless the work were done on a colossal scale, he imagined it would be too expensive to carry out. At all events, it was claimed that a product could be made—he thought commercially—containing up to 85 p.ct. of vitrain, and another product containing up to 80 p.ct. of durain. This obviously would be a great achievement for the coke and gas making interests. There were two questions he would like to ask: (1) Could one rely in general operation on a regular separation to a certain degree? (2) Could one control the blends with varying methods or obtain the same blend? He could imagine various crude commercial plants where perhaps six, eight, or ten different varieties of coal were delivered quite haphazard. They came, in the case of London, up the river, and were dumped into the bunkers of the carbonizing plant. One never knew even from what source the coal was coming, and it was a little difficult to imagine how a situation of the kind could be dealt with on the lines of the author's proposition.

Results Already Achieved.

Dr. R. Lessing said that the author made a statement which ought not to pass unchallenged, to the effect that it had been left to Germany to develop "this primary simple recognition along lines of commercial application that are likely greatly to benefit and improve our present methods of treating coal." He ventured to differ from this, and to state most emphatically that this work was really one way of trying to get at certain results which in England had already been achieved, and on which they had been working for the last 15 years. It had been

found that by blending two typical coking coals with non-coking or less-coking portions, the better qualities of coke were obtained. In that connection he referred to the work recently made public by Mr. Finn as the outcome of the researches of the Midland Coke Research Committee in regard to the addition of fusain to coking mixtures. It would be a very dangerous procedure if the general public or the casual reader were allowed to run away with the idea that those researches recommended the addition of fusain *per se*, generally speaking, as an undoubted improvement. The recommendation should be read only with the context, that the quantity of it should not exceed 3 p.ct., or as a maximum 5 p.ct. This was a very different proposition from allowing the addition at random of all the free coal dust that was produced from one particular seam. There was one term used in the paper which should on no account be allowed to go forward. It was the word "in-carbonization." There was available to-day a very good English term for what was intended to be conveyed by this horrid word, and that was the term "rank of coal."

Mr. JOHN ROBERTS said the word "Inkohlung" was difficult to translate into English, but what it meant was "the natural process of carbonization." "Pre-carbonization" might be a suitable word. There occurred the statement in the paper, "Durain alone does not coke at high temperatures, but gives an incoherent or very weakly bound residue. At moderate and low temperatures, however, it can produce satisfactory cokes, but these are certainly of quite different composition and structure to those obtained at high temperatures from vitrain and vitrain mixtures." He was rather afraid there were too many general statements in this paper, having in mind the very wide variation that was to be found in coals of various types. This statement depended entirely on what the author meant by coke. The next paragraph that needed qualification was with regard to vitrain: "Vitrain has the best coking properties and forms very homogeneous dense cokes of high quality and tensile strength." One was apt to draw the conclusion that any vitrain would give the best coking properties, but, in fact, all vitrains would not coke. Then the author went on to say, "High fusain coals are therefore high ash coals, and coals rich in fusain are not good coking coals." That statement must not go unchallenged, because one of the best coals in South Wales for coking—namely, No. 2 Rhondda coal—contained large amounts of fusain. Then there was the statement, "Fusain is an indifferent solid carbonaceous body to all distillation processes, so that (with no exception) it is harmful to all coal treatment processes," which required qualifications in view of Mr. Finn's work.

A QUESTION OF TIME AND TREATMENT.

There was another statement, continued Mr. Roberts, which might be questioned—namely, "Fusain is also not a thermal decomposition product of coal pristine substance. Governed by the metamorphosis of the original wood coal substance, so does vitrain or fusain result according to the length of time elapsing and the relative protection afforded to the material." It would seem on reading that statement that a fusain or a clarain or a vitrain was derived from the same substance, and that it was merely a question of time and treatment. But he recalled once examining a durassic coal—a lignite—and there were perfect specimens of natural charcoal in it, but on that charcoal there was bright coal, which might have been vitrain or durain; they were both of the same age, and the bright coal struck him as being the bark of the tree, while the natural charcoal was the substance of the wood. In his view, research had yet to point out that pure vitrain would produce better coke for blast furnace purposes than cokes as made at present. There was another point with regard to sulphur. He was rather surprised to find that the sulphur, especially if it was pyritic sulphur, was so easily air separated in this process, and that coals of such volatile content fused at such relatively low temperatures. He wanted to know what the author meant by "relatively low temperatures," especially when he went on to say that durain fused at the higher temperature. As a rule, low-volatile coking coals fused at a higher temperature than high-volatile coking coals, and here one had low-volatile coking coals. Again, he did not like the term "very young coals." It was not a question of the age of the coal; it was a question of maturity, and maturity did not necessarily depend on age. That was true in certain cases, but if one took coalfields in general, it was not true.

The author suggested—and the suggestion was not novel—that if one took the clarain-durain fraction one could get a suitable substance for carbonization at low temperature. He would refer the author to a paper read by Beade and Findlay in June, 1921, in which they proposed to separate these same constituents. They were following work which had been outlined previously by Dr. Lessing. They proposed to take the bright coal for the manufacture of metallurgical coke, on account of its strongly coking properties, and the dull coal for low-temperature carbonization. He himself had objected to that proposal at the time for the purpose the authors had in view, and had suggested that, instead of extracting the inert material from the coal in order to improve the coal, they should have added inert material to it.

SEPARATION IN THE BUNKERS.

Mr. L. H. SENSICLE reminded coke-oven managers that there was an instance of petrographic separation taking place in their own coal bunkers. It was quite a common practice to install a Carr disintegrator at the top of the coal bunker so that the crushed material, as it dropped down on to the cone of coal in the bunker, tended to segregate. The harder portions were not so fully crushed as the softer, or vitrain, portions, and there was a tendency for the nuts of the durain type of coal to find their way to the edges of the coal in the bunker. It frequently happened that when a coke-oven manager let his bunker get low in stock the material that he drew out when the bunker was nearly empty produced a markedly inferior coke, which broke up into small pieces, and was practically the same shape as the original pieces of coal from which it had been made. It seemed to him that a kind of elastic percussion went on even in the case of a Carr disintegrator; and it was, therefore, essential that one should avoid segregation of the material which went from such a crusher. The author had said that durain differed from place to place and seam to seam. It appeared to him that vitrain also differed, perhaps to an equal extent. Take, for example, the question of a good coking coal in South Wales and a good coking coal in County Durham. The finest foundry coke in the country was made in South Wales in one very limited area from a coal containing only 18 or 19 p.ct. of volatile matter, and yet the best Durham foundry coke was made from coal containing nearly 30 p.ct. of volatile matter. There seemed to be definite evidence that the vitrain in the South Wales coal must be very different from that in the Durham coal, if only in its volatile content. The question of the removal of sulphur by this percussion method might conceivably in the future assume an importance as great as that of the concentration of durain or vitrain fractions, if, as was suggested, there was a refinement of sulphur content in these fractions lower than that of the parent coal. Had the author any information as to the distribution of phosphorous in the microscopical constituents, and had any refinement of phosphorous content been observed in any fractions obtained from the process? That was a point which might also have a very important commercial aspect.

THE AUTHOR'S REPLY.

Mr. J. L. STREVENS, replying, said it is a very difficult thing to reconcile the various terms for coal constituents for English audiences, and it would be also difficult for American audiences. He thought it would be better to stick to the old terms, bright coal, dull coal, and mother of coal or charcoal. But even that brought confusion, for bright coals, for example, varied in their vitrain and clarain contents. Each coal was a study in itself, and he agreed with Dr. Lessing and Mr. Roberts and the other critics that it was not possible to generalize for Great Britain on work that had been done in Germany. With regard to the term "in-carbonization," his intention had been to translate the German word "Inkohlung" by "internal carbonization," meaning gradual change in carbon content by tectonic influences and pressure changes, and the other things which happened to it. He liked the term suggested, "pre-carbonization," or perhaps the English word "anthracization," which he believed had a place in coal terminology. He was aware of the effect of fusain on vitrain, but when he prepared the first part of his paper Mr. Finn's results were not before him. He had referred to them at the end. Vitrains from one seam were not necessarily identical with those from another. Some vitrains coked very well. With reference to the Chairman's remarks on blended coals, obviously if one got a mixed batch of coal one could not determine how to blend the constituents unless the petrographic separation were predetermined. When the terms, vitrain, durain, and fusain were used it was not necessarily meant that there was 100 p.ct. of each constituent. The name of vitrain was given to a vitrain fraction even if it only contained vitrain to the order of 30 p.ct., as long as it was below a certain size in the sieving, and had the characteristic vitrain properties. On the other hand, the durain fraction might be 90 or 95 p.ct. clarain. The confusion in terms and results would, he supposed, not be overcome until it was known exactly where they stood as regards the coal in England. Therefore, with a perfectly open mind, he would suggest that before the matter was seriously taken up in this country, co-operation should be sought, possibly with the Fuel Research Board or some similar Board, and each individual seam taken, worked up, and made a standard for that particular district. Then, when it was known that the coal was coming from that particular seam it would be known what to do with it.

Lochee Gasholder of the Dundee Corporation

Public Inquiry into Cause of Subsidence

An inquiry into the administration of the Gas Department of the Dundee Corporation was conducted before the Lord Provost's Committee on March 6, the proceedings having special reference to the Lochee gasholder, which subsided shortly after it was erected, owing to insecure foundations laid by the Gas Department.

The inquiry was conducted by Mr. Charles Mackintosh, advocate, Edinburgh. Both the Gas Manager, Mr. James Dickson, and the Assistant Manager, Mr. Laurence R. Hislop, were legally represented—Mr. Dickson by Mr. John Ross, solicitor, and Mr. Hislop by Mr. H. J. Carlton, solicitor.

Mr. Peter Low, late senior draughtsman at Dundee Gas-Works, and now Gas Manager at Elgin, gave evidence.

The following account is from the "Dundee Courier and Advertiser":

Manager's Evidence.

Mr. Dickson, in reply to Mr. Mackintosh, said that in January, 1928, he recommended land available for a new gasholder at Perrie Street, Lochee.

Mr. Mackintosh: You were aware for some time before any steps were taken towards the building of the new holder that the site was an old quarry filled in with rock and boulders?—Yes.

Did you consider at the time the question of the suitability of the site?—I had formed the opinion that we would need to do some reinforcing in order to make the foundation sound.

You mean you would have to put a tier of concrete below the gasholder?—No. I mean we would need to sink either piling or reinforced material through the ground.

When the Council had resolved to erect the gasholder on that site, his first active step was to require his technical staff to prepare a plan of the site, showing places where borings had been taken.

During the borings he and Mr. Hislop visited the site, but Mr. Low was there most frequently. There was a weekly report of the results the borers obtained, and he and Mr. Hislop discussed the results.

Mr. Mackintosh: By a letter dated March 12, 1929, sent by you, did you call off the men before they had finished the boring in 13 places marked on the plan, using these words: "We have now all the information we require, so we will be obliged by your calling off your men?"

Mr. Dickson: That letter was dictated by Mr. Low and sent to me for signature.

Mr. Mackintosh: Why were you satisfied that sufficient information had been obtained before borings had been taken at all the places marked?

Mr. Dickson: I felt by this time that a sound foundation could be put down there with the information before us.

Mr. Hislop and Mr. Low, Mr. Dickson added, were in agreement with his view.

Separate Tenders.

Contractors were asked to tender separately for the holder and the foundations, and he reserved the right to the Corporation to carry out the foundation work themselves.

In his view it would be more advantageous for the Corporation to do the foundations themselves. They had done a good deal of foundation work in the past.

So far as he could remember, the Gas Committee accepted without discussion his views with regard to the foundations.

Accredited firms experienced in the work were asked to tender for a raft concrete foundation only.

Mr. Mackintosh: In view of the fact that most of the contractors had quoted for piled foundations, did you consider as to whether it would be safe to dispense with piling?—Yes, decidedly. I discussed the matter with Mr. Hislop and Mr. Low.

What information did you have which led you to believe that it would be safe to dispense with piling?—The information I had warranted me in believing that the foundation could be sufficiently reinforced. I knew that piles were a more costly job, and I considered I would get sufficient security by a strong raft foundation. What led me to that conclusion was the information from the borings. The technical staff and I were in agreement about that.

Contractors' Letters.

Did it not occur to you, when so many of the contractors had quoted for piles, to consider their opinion in the matter?—No. I did not read the letters from the contractors stating that they would not take responsibility for a raft foundation, and the letters were not submitted to me by the staff.

Reference was made to the employment of a 12-ton roller on the site, and Mr. Mackintosh asked if that was a suitable test of the stability of the site. Mr. Dickson replied: "That was the decision taken."

Asked what the purpose of the roller was, Mr. Dickson said it was to solidify the ground in case of any uneven settling.

Mr. Carlton asked Mr. Dickson if it was his allegation that Mr. Hislop, in a report to the Gas Committee, when Mr. Dickson was absent, suppressed information which, had it been given, would have been in Mr. Dickson's favour.

Mr. Ross: That is our case. I say the information was deliberately kept out of the report to prejudice Mr. Dickson.

Mr. Carlton asked Mr. Dickson whether his view was that Mr. Hislop's report had been made and submitted out of motives of a personal kind.

Mr. Dickson replied that the report must have created a bad impression in his Committee against him.

Mr. Carlton: And the purpose of that was for personal gain?

Mr. Ross: It was not done out of friendliness, any way.

Mr. Dickson: I have always been very kindly in my remarks about Mr. Hislop, and I am not going to say anything very strong here.

In reply to Mr. Ross, Mr. Dickson said that Mr. Hislop was Assistant Manager of the Gas Department when he (Mr. Dickson) came to Dundee. Mr. Hislop had been on the short list for the Managership.

Until the happening of this gas tank and the publication of this report of Aug. 11, did it ever enter your head that Mr. Hislop was disloyal to you?—No. I had to speak to him sometimes about the way orders were carried out, but I did not put that down to disloyalty.

Speaking of the contractors' doubts as to the stability of the site, Mr. Ross asked whether any man of Mr. Hislop's experience could fail to realize the importance of that qualification in the tenders.—No; it was vital.

Had you known that the majority of the contractors offering for this work would not guarantee a raft foundation, would you have gone on with one?—No; I would never have put the Committee in the position I am placed in.

But this vital piece of information, which would have definitely decided you against a raft foundation, was not conveyed to you?—No.

If Mr. Hislop has said to certain members of his Committee that he was never consulted by you as to the work in connection with this foundation in Lochee, is that true?—Most decidedly not.

Mr. Hislop's Evidence.

Mr. Hislop was then questioned by Mr. Mackintosh. He had been second-in-command of the Dundee Gas-Works, he said, for more than 12 years. He had acted as Manager during Mr. Dickson's recent illness.

Were you aware, from the time it was first proposed to make a new gasholder in Lochee, that the Ferrie Street site was an old quarry filled in with boulders and rocks?—Yes. It was common knowledge in the Department.

Speaking of the boring operations, Mr. Hislop said that several times during the progress of the work Mr. Dickson spoke to him about it.

Was it not in consultation with you that Mr. Dickson sought to call off the borers?—Decidedly not. I mentioned to Mr. Dickson that I thought all the borings should have been taken.

Questioned regarding the letters from firms who tendered for the work, Mr. Hislop said no firm definitely guaranteed any foundation except a piled one.

I may take it, then, that from an early date—some time, at any rate, prior to the Gas Committee meeting of April 15—you were well aware that the majority of the contractors were of the opinion that a piled foundation was the only suitable one for this work?—Yes.

Certain of them, in fact, had definitely stated that any other foundation would be insecure?—Yes.

In your opinion, was it not necessary to say anything of what you knew—namely, the warnings that some contractors had given regarding the suitability of the site?—No, I don't think so. I thought the fact that the different contractors quoted distinctly for a piled foundation as a special point showed sufficiently what they thought about the site.

Rightly or wrongly, you did not inform Mr. Dickson of what you knew?—No, I did not. The letters were open for Mr. Dickson's perusal.

Mr. Hislop added that the matter of the contractors' warnings was discussed between himself and Mr. Low (the senior draughtsman) several times prior to the Gas Committee meeting of April 15.

But it did not occur to either of you to put into the abstracts any reference to the fact that the contractors would not guarantee the foundation without piling?—No; we thought the information contained in the abstracts was quite good enough.

Was it your view at this stage that the contractors were raising an unnecessary bogey?—I would not put it as strong as that. They had to safeguard themselves in what they wrote.

Was it, then, your opinion as an engineer that the site could be made secure enough with a raft only, without piling?—Yes, that is the opinion I had.

Were you in agreement with your Chief when he wrote on April 12 to the Committee recommending the acceptance of Messrs. Dempster's gasholder on a foundation laid by the Department?—Yes.

Letter to Mr. Low.

Reference was made at this stage to a letter written by Mr. Hislop to Mr. Low, who by this time had accepted the position of Manager of the Elgin Corporation Gas-Works. The letter was written about the time the subsidence of the Lochee gasholder took place.

It says here in this letter, after telling Mr. Low about the subsidence—"I have expected this to happen, as the matter of

solidifying the foundation over the quarry with a steam road-roller, as against a total weight of 10,500 tons, is, as you will agree, absurd." Was that your view all along or your contemporary view? At the time the roller test was employed you did not regard it as absurd?—No, but I changed my opinion on the matter.

There is another passage I will ask you to explain—" In view of the wording of the offers of the competing firms, who gave no guarantee for any other than a piled foundation and should advise us accordingly, I was always of the opinion that a serious error had been made in adopting the present inadequate foundation." Was that always your opinion, Mr. Hislop?—No, it was not my opinion.

Then that letter is not correct?—No.

Questioned concerning a report which he issued on Aug. 11, Mr. Hislop admitted that Convener Leslie, when he saw the report, gave him instructions not to issue it to the members of the Gas Committee.

Why, in spite of this instruction, did you issue that report on Aug. 11 to the other members of the Committee? Can you tell me that?—No.

" Let me suggest to you," Mr. Ross continued, " that you put that report out at the time when you knew your Chief was absent on sick leave for four months, and you knew he could not answer, because you knew that was the time when you could do most damage? "

Mr. Hislop did not reply.

He said later that he had always had a feeling of friendliness towards Mr. Dickson. He denied that he told deliberate falsehoods in his report. He thought he had given his Chief a " fair deal."

Mr. Low's Questions.

Mr. Hislop was then questioned concerning the letter by Mr. Low, who asked him what had prompted him to send it. " First of all, it was for your information," was the reply.

When I got this letter I thought over it very, very seriously, and I came to the conclusion that you were attempting to put words into my mouth. Had you any idea in your mind at the time that there would be an inquiry, and that by intimating to me certain facts in this letter I would come and support what was not right?—No.

Mr. Carlton did not lead any evidence from Mr. Hislop.

Mr. Low was then examined. He said Mr. Dickson, Mr. Hislop, and himself came to the decision that the borings at the Ferrie Street site should cease, and that the information obtained was sufficient to give them a good idea of the nature of the soil. That was after seven borings had been taken, and all three of them were in complete agreement.

Replying to Mr. Ross, Mr. Low said he was very much surprised when he got the letter from Mr. Hislop.

Mr. Carlton: You expected there would be an inquiry?—The letter itself states, " There will be some row." I 'phoned Mr. Hislop and expressed my regret that such a thing had happened. I did not challenge anything in the letter.

Mr. A. A. Leslie, Convener of the Gas Committee, stated that he expressly instructed Mr. Hislop not to issue the report of Aug. 11, because it was a reflection not only on the Manager, but on the Committee as well. Mr. Hislop had no instructions to prepare such a report.

This concluded the evidence. Mr. Mackintosh will consider the evidence and issue his findings.

Cheltenham and District Gas Order

A Special Order promoted under the Gas Undertakings Acts of 1920 and 1929, by the Cheltenham Gas Light and Coke Company, was the subject of inquiry at the Board of Trade Offices, Westminster, on Friday, Feb. 27, by Mr. J. F. Ronca (Director of Gas Administration).

The main purposes of the Order were to authorize the Cheltenham Company to purchase by agreement the undertakings of the Tewkesbury Gas Company, Ltd., and the Winchcomb Gas Light and Coke Company, Ltd. (which Companies are supplying areas to the north of Cheltenham, including the Borough of Tewkesbury and a large number of parishes in various rural districts of Gloucestershire and Worcestershire); to include also within its area of supply a number of parishes in various rural districts which, in the course of time, could be conveniently supplied from Cheltenham, particularly in view of the proposed amalgamation; to change the name of the Cheltenham Company to " The Cheltenham and District Gas Company; " to extend the Company's borrowing powers; and to modernize the Company's legislation.

The only opponent was the Cheltenham Corporation, which raised a number of objections to various provisions of the Order, some of which objections, however, were not pressed.

The Cheltenham Company was represented by Mr. H. R. Askew, and the Technical Adviser to the Company was Mr. George Evetts. The Cheltenham Corporation was represented by Mr. R. O. Seacome (Town Clerk).

Arguments for the Company.

Mr. Askew, on behalf of the Cheltenham Company, said that the capital of the Company, together with premiums, amounted to £278,692, and there remained to be issued £38,308, making a total authorized capital of £317,000. The loan capital issued was £42,500 in 4 p.ct. Debenture Stock, and there remained £15,000 to issue, the total authorized borrowing powers being £57,500. The capital expenditure on the whole undertaking at the end of 1929 (the last complete year for which figures were available) was £314,000, representing only about £543 per million c.ft. sold—a very low figure. As indicating the growth of the undertaking, he said that the gas sold in 1921 was 415 millions and in 1929 it was 578 millions, the average increase from 1921 to 1929 being about 17 millions per annum. The Company might fairly be stated to be an efficient, well managed, and modern undertaking, as proved by the fact that the existing price for gas was 8¾d. per therm, less a discount of 5 p.ct. for prompt payment, making a net figure of 8·3d. per therm. The works had been modernized in recent years, vertical retorts having been installed, of larger capacity than those replaced; the result of this and other alterations was that there was a surplus of manufacturing capacity at the Cheltenham Works, and it was supplying practically the whole of its existing limits of supply. The areas of the Tewkesbury and Winchcomb Companies were geographically very convenient for the supply from Cheltenham, and the linking up of those areas presented no difficulties either of an engineering or an administrative nature. It was obviously in the interests of the public, both in the inner and the outer areas, that an amalgamation of this sort should be effected.

Discussing the position of the Tewkesbury Company, he said it was incorporated in 1870 under the Companies Acts, and had no statutory powers. The population of Tewkesbury was about 5000, but the number of consumers there was only 690, so that there was a considerable margin for increase in the sale of gas. The gas sold was between 12 and 13 million c.ft. per year, and the average price throughout that area was 6s. 8d. per 1000 c.ft. The capital of the Tewkesbury Company was £8000 (in 1600 £5 shares) on which they had paid 10 p.ct. dividend for the last 25 years. There was also a debenture debt of £1575. It was proposed that the Cheltenham Company should pay £1575 in cash in respect of the debentures, and should give to the Tewkesbury Company's shareholders £10 of 5 p.ct. Cheltenham Stock for each £5 share of the Tewkesbury Company, which had been yielding 10 p.ct.; so that the same return was maintained on that money. The fluid assets over liabilities, which amounted to about £2200 in 1930, would also go to the Cheltenham Company. The compensation payable to Directors amounted to a total of £270, representing exactly three years' purchase of fees. The Secretary of the Tewkesbury Company would also retire, and would receive compensation amounting to £480. Counsel said that this was regarded as an eminently fair price, and incidentally a good bargain for the Cheltenham Company. It would impose no additional burden on consumers in respect of capital charges, and had been approved unanimously by the shareholders of both Companies.

Referring to the Winchcomb Company, he said that it was a small private company selling less than 5 million c.ft. of gas per annum, and the average price was approximately 7s. per 1000 c.ft. The population in the area of supply was 2700 and the number of consumers only 190, and there was clearly further scope for development. The terms agreed upon were that the Cheltenham Company should pay £3250 and take over the whole concern, together with the stocks, including, incidentally, a liquid balance of fluid assets over liabilities of some £490. If that payment was capitalized at 6 p.ct. it would represent a charge of £195 a year. On the other hand, the dividends which had actually been paid by the Winchmore Company had amounted to over £300 a year, so that there would be a considerable reduction in the charge for capital in respect of the gas supply in the Winchcomb area. The purchase of this Company also was regarded as a bargain, and obviously advantageous to consumers.

With regard to the other area which the Cheltenham Company sought to add to its limits of supply, in addition to the areas of Tewkesbury and Winchcomb Companies, he said that it included parishes which lay on the lines of the mains which would be laid to connect Cheltenham with Tewkesbury and Winchcomb. It was only reasonable that the Cheltenham Company should have powers to supply in those parishes. It was also sought to add parishes lying immediately outside the Cheltenham Company's existing area of supply in which it was hoped to develop further. It was anticipated that the linking up with Tewkesbury and Winchcomb would itself lead to considerable development.

With regard to prices, he said that the statutory maxima applying to the Cheltenham Company were 17·2d. per therm in the parish of Cheltenham and 19·6d. outside it, representing a difference of 2·4d. per therm. In the Draft Order the Company asked to be allowed, in the areas to be added by this Order, a maximum price exceeding that applying to the parish of Cheltenham by 6½d. per therm for the first nine months; a maximum price exceeding the Cheltenham maximum price by 5d. in the ensuing five years; and thereafter a price exceeding the Cheltenham price by 4d.

With regard to finance, he said that by this Order the Company did not ask for further powers than they had already for issuing preference or ordinary stock, but asked to be allowed to borrow an amount which was within £100 or £200 of the amount which they were in fact authorized to borrow by the

automatic operation of the Gas Undertakings Act, 1929—viz., half the amount of the issued ordinary capital.

Objections.

It was significant that, although fourteen local authorities—urban and rural councils, and boroughs—were entitled to raise objections to this Order, the only objectors were the Cheltenham Corporation. The latter objected to the extension of the Company's limits of supply over a wide area in which there was little demand for gas, and it was urged that the differential prices charged outside Cheltenham should be such that the Cheltenham consumers would not be injured.

Objection was raised to a clause to give the Company power to purchase land, by agreement, to the extent of 10 acres for the purposes of their undertaking, but at the same time prohibiting them from creating or permitting a nuisance or manufacturing gas or residuals thereon. The clause, said Counsel, was a model clause of the House of Lords, and was in standard form. The Corporation considered the area sought to be purchased was too great, but Counsel submitted that it was most reasonable. The third objection was that the Company should be precluded from storing gas on such lands acquired under the clause in the Borough, unless the consent of the Corporation was obtained. The Company was prepared to add a proviso to that effect, but giving power to the Board of Trade to say that in any particular case such consent ought to be dispensed with.

Mr. Seacome intimated that he would not raise further objection on this last matter, if that proviso were added.

Mr. Askew then dealt with a clause by which the Company sought power to invest to the extent of one-sixth of the amount of the authorized capital in companies, bodies, or local authorities engaged either in similar business or in business ancillary to that of a gas company. The Corporation of Cheltenham had objected to the clause, and had submitted that the duty of the Company was to concern themselves with the area entrusted to them. Counsel submitted that it was to the advantage of the gas consumers that the Company should be allowed to co-operate with others in the carrying out of various duties of a gas undertaking if it were more economical and efficient to do that than to carry on as a water-tight compartment. Again, there were cases in which desired amalgamations of two or more undertakings presented difficulties which for the time being could not be overcome, even though such amalgamations were desirable in the public interest. The powers in the clause under consideration, however, would enable such undertakings to enter into joint working arrangements for their mutual benefit before amalgamation could take place.

Mr. Ronca was concerned because the clause, as drafted, would confer upon the Company very wide powers, which would take them right outside the gas industry. For example, the clause would enable the Company to buy shares in Standard Oil, or even in a gramophone company—because gramophone companies used phenol for the making of discs.

Mr. Askew pointed out that gas companies did in fact carry on a wide variety of processes, and the clause merely gave the Cheltenham Company powers to co-operate with other bodies carrying on gas undertakings or businesses ancillary to that of a gas undertaking. In the last six or seven years Parliament had given to gas undertakings powers of equal or practically equal scope; it would be a pity if the Board of Trade were to take a view of this matter contrary to the whole trend of legislation in Parliament.

Mr. Ronca said that if the Board had doubts it would want a great number of precedents before it threw its doubts over.

Mr. Askew replied that precedents were accumulating very rapidly, and he indicated a number of them.

The Corporation had also objected to a clause giving the Company power to declare different calorific values in different parts of the area of supply, the desire of the Corporation being to ensure that the calorific value should be the same throughout the Borough of Cheltenham. The Company, however, were prepared to delete the clause.

Among other clauses objected to by the Corporation, one provided for the repeal of the provision, in the Company's Act of 1896, which limited the dividend on the preference shares or stock to 5 p.ct. In any case, the Corporation urged that the repeal or amendment of the provision of 1896 was not to affect preference shares or stock already issued. Mr. Askew pointed out, in the first place, that there was no existing preference stock; secondly, though it was all very well to impose a limit of 5 p.ct. on preference stock in 1896, far better terms than that must be offered to-day; 7 p.ct. was a reasonable outside figure.

The Corporation had also asked for special provisions varying the general law concerning the breaking up of streets within the Borough, on the ground that the provisions of the Gasworks Clauses Act, 1847, were inadequate to meet modern conditions. In this case the Company's attitude was that if the code of 1847 were to be changed it must be changed by general legislation.

Mr. *Geo. Evetts* (the Consulting Engineer who has advised the Cheltenham Company with regard to the proposals for amalgamation) gave evidence, and produced figures which served to corroborate the statements by Counsel. Some of the figures showed the sales of gas and the capital expenditure by the Cheltenham, Tewkesbury, and Winchcomb Undertakings for the three years ended 1929, and there were some notes concerning the purchase prices of the two latter undertakings, indicating that no additional burden would be involved on the Tewkesbury Undertaking in respect of capital charges, and that in the case of the Winchcomb Undertaking the burden would be less as the result of the amalgamation. Further figures showed that, whereas the average net selling prices of gas in Tewkesbury and Winchcomb respectively immediately before the negotiations for amalgamation were 6s. 8d. and 7s., the present average net selling prices were 6s. 2d. in both cases.

Discussing the cost of supplying the different areas, he said that on the basis of a sale of 20 million c.ft. of gas per annum in Tewkesbury—which figure represented an excess of 40 p.ct. over present sales—he could justify a difference in selling price as between Tewkesbury and Cheltenham of nearly 5d. per therm. He was confident, however, that after five years the sales at Tewkesbury would be considerably more than 20 million c.ft. per annum, and the difference in cost of supply as between Cheltenham and Tewkesbury would be reduced by 1d. The cost of supplying the rural areas outside would be greater than that of supplying Tewkesbury and Winchcomb, but he could not calculate how much more. It would be unfair, not so much to Cheltenham as to Tewkesbury, to take a supply to some of those rural areas at enormous cost of development and charge the consumers the same price as in Tewkesbury. That was why the Company asked for a series of maximum prices; they would then have scope to deal with each part of the area fairly. There were opportunities for very great development in Tewkesbury, and the Company ought to have the power to reduce the differential there if the conditions warranted it.

Discussing the clause by which the Company sought power to invest a portion of their capital in other undertakings, he gave instances of the manner in which gas companies on the Continent had entered into working arrangements with, and had invested money in, electricity and chemical undertakings, with beneficial results. These indicated what could be done in the way of rationalization where gas companies were not hampered as they are in this country.

Cross-Examination.

Replying to Mr. Seacome, who cross-examined, Mr. Evetts said that it was proposed to scrap the Tewkesbury and Winchcomb Works and to supply gas in those areas from Cheltenham.

Mr. Seacome cross-examined at some length with a view to showing that development in some of the added areas, which were very rural in character, would be costly. Mr. Evetts' replies were to the effect that the Company wished to deal with each part of the area fairly, so that no extra burden would be placed upon Cheltenham. He added that they had carefully avoided asking for powers to supply in territories which might be supplied more conveniently by some other undertaking.

Mr. Seacome, addressing Mr. Ronca, emphasized that, although the Corporation were the electricity undertakers in Cheltenham, they were not opposing this Order for that reason; they had no wish to prevent the successful development of the gas undertaking. The Corporation had regarded the Gas Company's proposals from the point of view of the gas consumers in Cheltenham. With regard to the clause giving the Company power to purchase land by agreement, he said it was essential, for the protection of the town planning authority, to insert a provision that nothing in the clause should authorize the purchase and use of land in such a manner as to contravene the provisions of the Cheltenham and District Joint Town Planning Scheme. That scheme covered a considerable portion of the area under consideration.

With regard to the breaking up of streets, he urged that the provisions of the Gasworks Clauses Act of 1847 were out-of-date, having regard to modern road construction. The Company had agreed with the County Council already with regard to roads, and he considered that the Corporation were reasonable in asking the Company to come to a similar agreement with them.

Another point he made was that the Company had asked to include within their area of supply a good deal more than was reasonable; some of the parishes on the fringe of the proposed added area should be omitted, having regard to their very small population and number of houses, and their great distance from Cheltenham. There were no signs of growth in some of them; indeed, comparing the last two census returns, the population of some of them was decreasing. The Company had asked that they should not be compelled to charge definite prices, and if the Order were granted in the form in which it was promoted the Company would be able to charge prices in the outer areas which would be unfair to Cheltenham consumers. He suggested a provision in the Order that the costs of supplying the outside areas should be kept separately, and that, up to the maxima of the authorized charges, the outside areas should definitely bear the cost of their development.

As to borrowing powers, he said that, although the increased capital expenditure contemplated was only about £20,000, the Company sought additional borrowing powers to the extent of £148,000—over seven times the amount they really required. That seemed very excessive.

The clause giving power to invest money in other undertakings, he submitted, was clearly *ultra vires*. The Company had been incorporated for the development of gas supply in Cheltenham and the area around.

Mr. Askew, dealing with the legal aspect of town planning, said that, although Section 8 of the Town Planning Act of 1925 provided that land acquired for the purposes of a public undertaking was exempt from compulsory acquisition, it was provided by other sections of the Act that any buildings put up by a gas or other company which contravened a town planning scheme might be pulled down without payment of compensation. Since 1909 the general law had provided for the protection of gas undertakings; during that period there had not been a single case in which Parliament had imposed a clause restricting a gas company as the Cheltenham Corporation sought to have the Cheltenham Company restricted, and he urged that the Board of Trade could not create a precedent in that matter.

The inquiry then closed.

Lea Bridge District Gas Company

Annual General Meeting

The Annual Meeting of the Company was held on Tuesday, March 3, at the Company's offices, 63 and 64, Chancery Lane, London, W.C. 2—Mr. A. M. PADDON, M.Inst.C.E. (the Chairman), presiding.

The notice convening the meeting was read by Mr. HENRY HAND, the Secretary; and the report of the Directors and statement of accounts for the year ended Dec. 31 were taken as read.

The CHAIRMAN, proposing the adoption of the report and accounts, said that if the statement which it was the duty of the Board to present to the proprietors that day were taken at its face value, it would still be a creditable one for those responsible for it, but as a matter of fact it was much more favourable than was disclosed by the facts and figures in connection with it. The explanation was to be found in the second paragraph of the report.

MONTHLY ACCOUNTING ADOPTED.

This paragraph acquainted the proprietors with the fact that since the time of the last meeting there had been brought into operation by the Company a system of monthly collections, as a divergence from the quarterly collections customary. He had all along thought this was one of the most important reforms that the Gas Industry could adopt. His experience had taught him, as it had taught many other administrators, that the practice of presenting to the consumers their indebtedness in a cumulative form had often led to restriction in the use of gas. Several of the leading Metropolitan Companies had adopted this monthly system, and the result had proved beneficial, whether with reference to the consumers or the Company concerned. It was not only a question of gas; there was also the matter of appliances to be considered. When, after a heavy winter spring was approaching, the consumer received a heavy account both for gas and also for the hire of appliances, the experience had generally been that there was a return of apparatus which was altogether opposed to the interests of the Company. Since the adoption of the new system, this had been almost entirely evaded. There was, however, still another point in its favour. He knew personally that in the old days the number of queried accounts was very large, and this meant, in the case of any important undertaking, that a special department had to be maintained for the purpose of dealing with the accounts which were disputed, and attempting to satisfy the consumer that he had had what he was paying for. The consumer paid, but he might not be satisfied. There was, in addition, that kind of consumer who, although he would not make a specific complaint, nevertheless felt that he had been unfairly dealt with; the consequence being that, although he said nothing, his relations with the company were very much qualified by what he had in his mind. By the change it was hoped to avoid disabilities of this character, and their experience showed that they would do so. The change-over had involved a great deal of work, but the staff entered into the matter with enthusiasm, and carried everything through with the greatest smoothness. Personally, he had not the slightest doubt that the future of the Company would be immensely benefited. But with regard to the effect on the present accounts it means that, by reason of having to take the final reading of the year a little earlier, they had credited themselves both with less gas and with less money, as a matter of comparison, than in the preceding year. Thus, although the accounts were satisfactory, they had as a matter of fact carried forward to the current year some 28,000,000 c.ft. of gas which ordinarily would have been credited to the present accounts, and there was a sum of about £5000 which, as a matter of strict comparison, should have been credited to the present accounts. When allowance had been made for this, the unaccounted-for gas came down to the very moderate figure of 4¼ p.ct., which, in a growing district, was a very good standard indeed.

ACCOUNTS.

Turning to the accounts, it would be seen that they had power to issue capital in the future more than commensurate with their probable requirements; the amount being £178,000 of stock and £125,000 of loan capital. They had received £390,000 of capital, to which had to be added a loan from the bankers of £20,000 obtaining at the end of the year. These two sums together showed that during this period they were employing only £418 per million c.ft. of gas, which was an extremely satisfactory figure in these days. Ever since the war, the cost of material, wages, &c., had been increased, and it was certainly gratifying to realize that to-day their capital per million was less than before the war. On the debit side of the capital account it was shown that during the year they had expended just over £17,000, but they had been able to write out of account by depreciation over £9000; so that the expenditure over the twelve months had been extremely moderate. In the revenue account the receipts for gas, rental of meters, stoves, and fittings, were £6500 less, and the price of gas to the ordinary consumer had stood at the same figure (8·4d. per therm, less discounts) throughout the year. But it did not transpire that they had in the meantime made a substantial reduction in price to the prepayment consumers, who were 55 p.ct. of the total number of the consumers, and represented, roughly speaking, some 50 p.ct. of the business. Therefore, any concession in price to them had a material effect on the Company's finances. The Board now felt that they had established very favourable relations with this class of consumer, and that they might look for continued development in this direction. It was interesting to note how rapidly the Gas Industry developed in this department of its business, whereby, not only was the money paid in advance, but the consumer was enabled to realize exactly where he stood—a fact which gave him encouragement in the use of gas. Of course, this would now be largely the case with the ordinary consumer, and an improvement in his attitude towards the use of gas might be anticipated accordingly.

In the matter of residual products, coke and breeze accounted for £3361 more, but there was a decrease of something over £500 in the receipts from tar and ammoniacal liquor. It was almost hopeless in these days for a small undertaking to expect to secure any revenue from ammonia. Tar was not so good as a year ago, but nevertheless it was an important consideration in their revenue account. The net result was that they had received on all counts £3650 less than a year ago. Coming to the other side of the revenue account, there were some very interesting figures. There had been saved on coal, oil, and coke nearly £2000, and there had also been a saving on carbonizing wages, due to the more complete use of the vertical retort system, which had been brought to a high pitch of perfection by their undertaking. Repairs and maintenance of works and plant were slightly less. On the other hand, repair, maintenance, and renewals of mains, &c., showed an increase of over £2000, and the same item in respect of stoves and fittings amounted to nearly £3000 more; but both these figures were indicative of brisk business. The profit was less by £2304, but they would regard this in the light of what he had already said. If the accounts were adjusted to give a true comparison, they would not have any such decrease in profit to report. In the profit and loss account it would be seen that, after they had met all the requirements as recommended for dividend and other charges, they carried forward £35,566 to the next account, and this was rapidly approaching the limit imposed upon them by Parliament. The carry forward was increased on the present occasion by nearly £400, which represented the surplus on the year's trading.

In the reserve funds account they had over £44,000 invested. This was about 16 p.ct. on the ordinary and preference capital, and provided for two years' dividends, so that it was a very real reserve. The special purposes fund investments amounted to £24,450. This was a fund affording a very high measure of financial protection. With regard to the benefit fund, it was satisfactory to see that the pensions and gratuities were less than the amount transferred from revenue account, and with their investments they had an even more satisfactory balance over their disbursements. Of course, the whole subject would have to be reconsidered, because they were carrying on this responsibility with machinery provided twenty years ago, and it was not actuarially adequate for the purpose. Therefore, when they met again, the proprietors would probably find that the matter had assumed a different complexion. In the balance-sheet, it was very satisfactory that, whereas the book value of their investments was shown at £68,851, their valuation at the date of account was £76,505. So there was a little enhancement of what he had already said about this fund. The loan from the bankers had disappeared, after a recent very successful issue of capital, and at present they had no loan of this kind. There was provision for renewals of vertical retorts to the extent of £23,400, and a suspense account of £14,000 on the other side of the account. Setting one against the other, their provision was rather in excess of what they had been committed to.

THE GAS INDUSTRY DEMANDS FAIR PLAY.

They started this year, as he had said, with a little fillip, and all the indications were that their business was progressing at a greater rate than in the preceding year. Circumstances were favourable, and he had no doubt that a year from now they would be in no worse condition. The Gas Industry had been subjected to a good deal of attack from outside. The leaders of the industry had referred to this, and the Press had very fairly dealt with the matter and ventilated it in the public interest. The grievance was the strong preference given quite indiscriminately to the electrical industry, which, if it was half as good as people said, it ought not to need after fifty years or so of existence. Then, of course, there was the attitude of certain municipalities in restricting the use of gas in buildings provided by them. This was very unfair. The London County Council, however, had recently adopted a recommendation that there should be a free choice given to the tenants of their dwellings in the use of commodities they might require for domestic purposes. In other words, they might use gas or electricity as they thought fit. This, as he had said, had not been the attitude of some municipalities responsible for the supply of electricity, but he ventured to hope that the example set by the London County Council would have some effect, and that the injustice to which he had alluded would be removed. He could give them an instance of the difference in the attitude of gas

and electricity undertakings in this matter. It was in connection with a company south of the river with which he was associated. The Gas Company received an intimation that gas would not be allowed to be used in certain municipal dwellings that were being erected. The Company protested, and asked why such unfair procedure was adopted. The municipality said the trouble was they would like their tenants to have the use of electricity, if they wished it, for lighting, but when they went to the Electricity Supply Authority they were told that, unless gas was excluded altogether, they would not lay their cables or offer a supply. The attitude of the Gas Company was that they did not mind what was done, provided they were allowed a fair opportunity to sell their commodity, gas; but in the case he had mentioned, the Electricity Supply Authority seemed to think they could not do business unless gas was excluded. That appeared to epitomize the case of municipalities supplying electric current. Of course, with companies supplying electricity it was perfectly straightforward competition, and the Gas Industry could abide by the result. But the root of this trouble was in municipal trading. He hoped, after the manner in which the matter had been ventilated, that the gas undertakings would at last receive fair play, which was all they wanted.

The DEPUTY-CHAIRMAN (Mr. G. W. Carey) seconded the motion for the adoption of the report and accounts, and it was carried unanimously without discussion.

DIVIDENDS AND VOTES OF THANKS.

On the proposition of the CHAIRMAN, seconded by Mr. E. L. BURTON, dividends were declared for the half-year ended Dec. 31, 1930, at the rate of 5 p.ct. per annum on the 5 p.ct. preference stock, 6 p.ct. per annum on the 6 p.ct. preference stock, and 8½ p.ct. per annum on the consolidated ordinary stock, all *less* income-tax.

The DEPUTY-CHAIRMAN then proposed the re-election of Mr. Paddon as a Director of the Company. He (Mr. Carey) had had nearly twenty-seven years' association with Mr. Paddon in that Company and elsewhere, and he could say that the Chairman's presence on any Board was a source of the greatest strength to the undertaking concerned. He was a born administrator, and was a Chairman of exceptional ability.

Mr. BURTON seconded this, and it was unanimously agreed to, as was also the re-appointment as an Auditor of Mr. R. E. Gisburne.

The CHAIRMAN next proposed a hearty vote of thanks to the officers, staff, and employees generally, for their services to the Company throughout the past twelve months. It had not, he said, been an easy period, but all had worked loyally and well. In their Engineer and Manager they had a gentleman whose gifts and accomplishments were beyond his years, and in their Secretary they had a wide experience which was of infinite value to them in the conduct of their affairs.

Mr. STANLEY H. JONES, seconding, said he had not long been a Director of the Company, but he had been very much struck with the admirable work which was done.

The vote was heartily accorded, and acknowledged by Mr. HENRY HAND (Secretary), and Mr. D. CLEAVE CROSS (Engineer and Manager). Mr. Cross said he would like to place on record the loyal work of the staff, to which the Chairman had alluded, during the change-over to the monthly account system. Only those who came in close contact with this kind of thing could realize the tremendous amount of additional work that had been involved. He would also like to say how greatly those connected with the Company appreciated what the Directors had done for them during the past year. They had erected a very fine pavilion on the Sports Ground, and now they were building an equally fine institute for social purposes.

A vote of thanks to the Chairman and Directors was cordially passed, on the proposition of Mr. PIERCE, seconded by Mr. ELLIS, who said this was his first attendance at a meeting of the Company, and he would like to express his admiration of the way in which the Chairman and Directors looked after the interests of the proprietors.

The CHAIRMAN, in acknowledging the vote, said the Board hoped that when they met the proprietors again, they would be able to give them an equally satisfactory account of their stewardship.

Barnet District Gas and Water Company.

The Ordinary General Meeting of the Barnet District Gas and Water Company was held at the Cannon Street Hotel, E.C. —Mr. WILLIAM CASH, F.C.A., J.P., presiding.

The CHAIRMAN said that the strength of their position lay in the fact that their water undertaking was the predominant part of the business. With regard to what they had done during the past year, the gas section showed satisfactory progress, sales being up by 2½ p.ct., as compared with 1929. The Board considered that very satisfactory, because the first half of 1929 was extremely cold, and in those six months they had an increase of 10½ p.ct., as compared with the corresponding period of 1928, so that the two years showed an increase in quantity of 10 p.ct.

During the past year they had put on 507 new ordinary consumers and 566 new prepayment consumers—a total of over a thousand. Their gas consumers now numbered 11,924. During the year they had laid nearly 10 miles of new gas mains, making a total mileage of 112. The price of gas during the past year had remained constant at 10·2d. per therm, a very satisfactory price for a Company of their size. Their sales of fittings and the profit made on them showed a substantial increase.

With regard to capital expenditure, there had been some small extensions to gas-works plant, and they had put in a new oil storage plant with a capacity of 70,000 gallons. The mains included a new main to South Mimms, which they had been enabled to construct by reason of the fact that the Treasury had agreed to assist them, and the Company would receive for four years a contribution of interest of 3 p.ct. on the outlay.

With regard to water expenditure, there had been a considerable outlay in connection with the Arkley reservoir opened in June last. This reservoir was a credit to Mr. Haseldine, their Engineer and Manager. They had laid a new 20-in. main from the new reservoir to Barnet.

They had made one issue of stock during the year—namely, £35,000 of 3 p.ct. debenture stock at the satisfactory price of 97. He believed that the stock was worth more than that figure at the present time. From the profit and loss account it would be seen that the combined profit was up by £5777. They had increased the appropriation to the reserve fund, and he thought that the proprietors would agree that the results were entirely satisfactory.

The gas business was run in competition with electricity and oil, oil being a real competitor from the point of view of heating. He suggested, however, that on account of its convenience and cleanliness, and by reason of the fact that gas appliances were becoming more and more efficient, and, further, in view of the price which they were able to charge for it, gas ought to be able to continue to hold its own, in spite of competition. The price of gas at Barnet was equivalent, heat for heat, to electricity at 0·348d. per unit, and at that price he did not think they had anything to fear from competition.

The report and accounts were unanimously adopted; and at a subsequent Extraordinary General Meeting the Directors were authorized to issue, as and when required, ordinary or preference stock to the extent of £175,000 and £87,500 of perpetual debenture stock.

Newcastle-upon-Tyne and Gateshead Gas Company.

The Annual Ordinary Meeting of the Newcastle-upon-Tyne and Gateshead Gas Company took place in Newcastle.

Mr. JOHN EDWARD COWEN, J.P. (the Chairman), after reviewing the items in the revenue account, said: In view of the fact that we have given our consumers the benefit of £20,000 in reduced prices for gas, and that our receipts from residuals are considerably lower, it is gratifying to find that the final result enables us to pay the usual dividend on the preference stocks and to recommend the payment of a final dividend of £2 17s. 6d. on the ordinary stock, which, with the interim dividend paid in August, makes £5 7s. 6d. p.ct. for the year, and to increase the amount carried forward by £737.

I am glad to say that we can record progress and success with our public lighting; there is again an increase in the number of public lamps using gas. This year the increase is over 700, making a total of 22,980, which compares very favourably with other undertakings in the country. Newcastle is one of the best lighted cities in the kingdom, and over 240 miles of streets are lighted by gas. In Gateshead we have just relighted with high-power lamps and directional reflectors a large portion of the two main streets, and the result has been so satisfactory that the Corporation have given us instructions to extend this new form of lighting. We have also obtained a five years' contract for the public lighting of the Borough of Wallsend. In Newcastle and Gosforth the public lamps for many years have been lighted and extinguished by means of apparatus fixed in each lamp which is actuated by waves of increased pressure sent through the mains from the gas-works. Arrangements have, however, been come to with the two local authorities named whereby the Company will substitute at their own cost clocks for operating the lamps.

Taking into consideration the weather conditions during the past year and the trade depression, we are quite satisfied that we have been able fully to maintain the 1929 sales—in fact, the 1930 figures show a very slight increase over the previous year, and in 1931 we have made a very good start with sales.

INDUSTRIAL DEVELOPMENT SECTION.

We have had in operation during the whole of 1930 a special department for the development of the sales of gas for industrial purposes, for which it is an ideal fuel. We have also had in operation the two-part tariff to which I have already referred, and which more particularly affects industrial users, and I am glad to report that notwithstanding the trade depression the sales of gas to those on the two-part tariff show a 5 p.ct. increase over the consumptions of the same persons in 1929. We are further developing this side of the business by reducing the price still further for larger consumptions and for new uses of gas, and we hope in this way so to increase our sales that as a result we shall be able to make a reduction in price to the small as well as the large consumers. We have an industrial laboratory and an expert staff, and we are in a position to be most helpful to any new industries which may start in our area.

Our arrangement for the supply of coke oven gas is very

helpful to us, and when normal trade takes the place of the present depression on Tyneside we are in an excellent position to take full advantage of it. We are, moreover, in a sound position internally; our ordinary stock has stood higher in the market this month than at any time since 1914, and I look forward to the future with every confidence.

In view of the fact that they had given their consumers the benefit of £20,000 in reduced prices for gas, while receipts from residuals were lower, it was gratifying that the final result enabled them to pay the usual dividend on the preference stocks (£4 p.ct.), and to recommend the payment of a final dividend of £2 17s. 6d. on the ordinary stock, making £5 7s. 6d. p.ct. for the year.

On the motion of the CHAIRMAN, seconded by Mr. JAMES WILLIAM ELLIS, the Deputy-Chairman, the Directors' report and account were unanimously carried.

Derby Gas Light and Coke Company.

The 111th Annual Meeting of the Derby Gas Light and Coke Company was held at the Head Offices, Friar Gate—Mr. WILLIAM WOOLLEY (Chairman) presiding. Alderman J. Ferguson Bell, General Manager and Engineer, was unfortunately prevented from attending the meeting through indisposition.

In moving the adoption of the Directors' report, the CHAIRMAN said he had prepared a speech, which he would ask the Secretary to read. It was as follows:

There is no increase in the called up capital, but the loan capital now remaining to be issued is increased from £31,017 to £254,671. We have expended on capital account £26,527, less £11,250 written off for depreciation of stoves and meters, and this leaves a net capital addition of £15,277. The capital account is over expended by £91,697. However, although the amount expended is in excess of that raised, there is no urgency for the Company to issue additional capital, as at the end of the year the cash at bankers and in hand was £70,491. Adverting to the expenditure side of the accounts, the cost of manufacture is £189,481, a decrease of £19,849 compared with 1929. Coals and oils have cost less by £3997, entirely due to less quantities used, the average price paid for coals being slightly higher than the previous year. The other items do not differ widely, except repairs and maintenance of works and plant, the amount expended thereon after deducting old materials sold is £30,907, as compared with £47,147, a reduction of £16,240. The total cost for distribution is £57,356, an increase of £2145, due largely to the continued expansion of business.

Rates amount to the large sum of £13,298, an increase of £119. Income-tax is £16,821, being an increase of £4155, thus for local and Imperial taxation we are called upon to pay no less than £30,119, which is more than half of our gross profits for the year. The last item of expenditure is a new one, £20,000 as a nucleus of a Development Fund which will be used to defray expenditure to be incurred by the Company on capital account in carrying out new work in connection with the bulk supply of coke oven gas. The total expenditure for 1930 was £295,836, being £2066 less than 1929.

The sale of gas amounts to £240,325, a reduction of £9904, due as stated in the report to a decreased output of 4½ p.ct., entirely caused by trade depression. There is an increase of 1687 consumers, and we now have altogether 47,488 ordinary and prepayment consumers; 5133 additional gas appliances were sold and fixed on hire to the value of £32,866 during the year. The rental of meters and stoves is up by £618, as a result of increase in numbers fixed.

Residual products have produced, after deducting expenses of manufacture, &c., £73,467, an increase of £1922, which we consider satisfactory, the only disappointing item being that of sulphate of ammonia.

The total receipts are £351,715, being £7283 less than last year, and the gross profit carried to profit and loss account is £55,879.

Col. G. A. STRUTT seconded.

Increased Sales at Exeter.

There was a large attendance at the Annual Meeting of the Exeter Gaslight and Coke Company, held at the Head Offices, Southernhay—Mr. JOHN E. DAW (Chairman) presiding.

The CHAIRMAN, in moving the adoption of the report and accounts, said that the report showed that the Company had increased during the year the sale of gas by just over 15 million c.ft., or 71,523 therms, which, coming over a very large increase in 1929, was very satisfactory. The amount standing to the credit of the profit sharing and pension fund, which began to operate on July 1, 1930, was £1641 10s., but, in order that they might have a solid foundation, no pension could be paid out for ten years.

The Directors in May, 1930, invited tenders for 4750 additional new ordinary £10 shares, and the issue was largely over-subscribed. The total realized for the £47,500 additional capital after deducting expenses was £52,602 19s. 4d. These showed a sufficiently increased profit to cover all charges, including the dividends on the increased capital. On the other side he must call attention to increased taxation. In 1930 the Company paid in income-tax, local rates, and contributions to health and unemployment funds no less than £12,179 11s., which was more than the total net dividend on all the Company's capital (excluding debenture interest), which was only £10,982 6s. 11d. This was not an encouraging picture from a trade point of view.

The following resolution was passed, on the motion of the CHAIRMAN, seconded by Mr. L. D. THOMAS: That a final dividend be declared at the following rates per annum for the six months ended Dec. 31: 4 p.ct. on the preference stock, 5 p.ct. on the preference shares, 7½ p.ct. on the new ordinary shares, and 10½ p.ct. on the original stock, all *less* income-tax.

Harrogate Gas Company.

The Annual Meeting of the Harrogate Gas Company was held at the Offices, James Street, Harrogate—Mr. FRANCIS BARBER (the Chairman) presiding.

The CHAIRMAN said: The amount overspent on capital account at the end of the previous year was £115,998. The amount expended during the past year, after deducting £343 from sale of old plant, was £15,980. The amount to be raised was therefore £131,979. Owing to the very sudden and large demands of one consumer at Tadcaster, we are at present enlarging our storage accommodation up to 92 p.ct. at a cost of £954. We next propose to add at the works a plant, the present cost of which would be £3000, for dehydration of gas.

Turning to revenue account, the profits to be carried to net revenue are £29,485. Summarizing revenue account, it shows that the receipts were less by £2665, and the expenditure more by £1846. We are therefore on the accounts worse on the previous year by £5511. It is not an unusual experience for our profits to show in some years an increase of as much as £6741 in one year, followed by two years of reduction of £1677 and £2209, the figures of 1923, '24, and '25, but these variations, as in the present case, are explainable.

The report says there was no actual reduction in the consumption of gas, and so it is, though on the accounts there would appear to be a reduction in the sales of gas of £57. The time at which the readings of the meters are taken may result in part of the consumption of the year being omitted, or may include gas consumed after the termination of the year of account. Correcting the consumption for 1929, we find that it was actually 606,222,300 c.ft., as against 611,002,600 c.ft. for the 364 days included in the meter readings for last year, we find that instead of a decrease in 1930 we had an increase of 4,780,300 c.ft. This represents in money £1060, which, added to the £426, makes the actual position on the year better by £1486, and giving in actual value the sales of gas for 1929, £96,957, against £97,893, *plus* £1486 = £98,879 for 1930, an increase of £1921. We are, therefore, entitled to regard on correct meter readings a credit of £1486, against the £4501 of our reduced profit, bringing it down to £3015.

Turning to the debit side of the account, we find under this head that there is a reduction of only £340 in the aggregate, but on examining the detail we find much satisfaction. The carbonizing wages and other charges work out at 3s. 9·4d., as against 3s. 10·5d. in 1929 and 4s. 8·7d. in 1928. We carbonized 2131 tons less coal than in 1929, and produced 657,901,600 c.ft. of gas, yielding 77·9 therms per ton, as against 670,844,100 c.ft. of 73·47 therms per ton. Had the same result been attained in 1929 we should have saved on that year 1286 tons of coal. These results have been attained entirely through our vertical retorts. It follows that there is slightly less coke and slightly more tar per ton. The yield of coke per ton was 8·43 cwt., against 9·02 cwt. in 1929. Tar was 13·3 gallons, against 12·84 gallons in the previous year.

We have sold during the year for heating and cooking 2050 appliances, and for lighting 8207 appliances. New lighting pendants and brackets have averaged 112 per month, a total of 1336. The high initial cost of cookers and water heaters and their installation is confessed by would-be customers to be the stumbling block in the way of business, and we are considering the formulation of a hire-purchase scheme for the sale of these apparatus at easy quarterly payments over longer periods, for which there is still a considerable market before saturation point is reached.

The report and accounts as presented were adopted, and a dividend of 10 p.ct. per annum, *less* 5 p.ct. interim dividend paid in September last, was declared.

South Shields Gas Company.

Mr. HENRY CHAPMAN, Chairman of the South Shields Gas Company, presiding at the Annual Meeting, referred to the relations existing between the Company and the South Shields Corporation, and said that they were not of a harmonious nature as the Electricity Department was in competition with the Gas Company, and there was reason to suggest that on occasions every effort was made to get the Company's business by hook or by crook. Proceeding, Mr. Chapman said that the Company had 39,457 consumers, and during each of the last two years the sales of gas had increased by over 13 million c.ft. Many consumers had abandoned electricity and returned to gas. The income for the sale of gas showed an increase of £605 as compared with the previous year, and from residual products an increase of £839. There was a reduction of £1089 in expenditure on the revenue account, and distribution expenditure showed an increase of £1491. The income amounted to £132,426, and the expenditure to £109,341. More than 4000 gas lighting burners were supplied and fixed during the year.

Dividends of 8½ p.ct. per annum on the consolidated and new stocks and 5¾ p.ct. on the ordinary stock were declared.

Watford and St. Albans Gas Company.

Presiding at the Annual Meeting of the Watford and St. Albans Gas Company on Thursday, Feb. 26, Mr. FRANK HARDING JONES (Chairman and Managing Director) referred to the success of the amalgamation of the two Companies and the acquisition of the Elstree Company in October last, and the pending taking over of the Hemel Hempstead Company.

The CHAIRMAN moved the Directors' report, which stated: The Elstree and Boreham Wood Gas Company, Ltd., was transferred to the Company as from Oct. 1, under the provisions of the Watford and St. Albans Gas Order, 1930. Accounts for three months only in respect of the Elstree area are included. The enlarged area of supply has increased the gas sales to nearly 1000 million c.ft. per annum. The works and plant are in good order, and all districts are being steadily developed. The issue of £100,000 of 5½ p.ct. preference stock made in June was oversubscribed. On Oct. 1, 1930, the Watford "A" stock was converted into "B" and 5 p.ct. preference stock, and the Elstree ordinary and preference shares were converted into Watford "B" and 5 p.ct. preference stock. The whole of the "B" stock of the Company was then re-named "ordinary stock."

The revenue account shows a profit of £35,840, and the profit and loss account (net revenue) a balance of £34,657, after providing for interim dividends and other charges. The Directors, therefore, recommend the payment of dividends as follows: On the 5 p.ct. preference stock (issued Oct. 1, 1930) at the rate of £1 5s. p.ct. for the three months ended Dec. 31, 1930. On the 5½ p.ct. preference stock at the rate of £2 15s. p.ct. for the half-year. On the "A" stock at the rate of £2 1s. 3d. p.ct. for the three months ended Sept. 30, 1930, making, with interim dividend paid in August last, £6 3s. 9d. p.ct. for the nine months. On the ordinary stock at the rate of £3 7s. 6d. p.ct., making, with the interim dividend paid in August last, £6 15s. p.ct. for the year, and on the ordinary stock (issued Oct. 1, 1930) at the rate of £1 13s. 9d. p.ct. for the three months ended Dec. 31, 1930. (All *less* income-tax.)

The DEPUTY-CHAIRMAN seconded the adoption of the report and accounts, which were approved, and the dividends as recommended were authorized to be paid.

Reading Gas Company.

The Annual General Meeting of the Reading Gas Company was held on Feb. 24 at the Offices, Friar Street, Reading—Mr. STANLEY HAYWARD, J.P. (Chairman), presiding. The SECRETARY AND ACCOUNTANT (Mr. A. B. Stedman) having read the notice convening the meeting, the report and accounts were presented. The accounts accompanying the report show that the income for the year was £256,722, and the expenditure £223,397, leaving a balance of £33,325 to go to the profit and loss account. The sum available for distribution was £39,713, and the Directors recommended the payment of dividends at the statutory rates for the half-year ended Dec. 31 last, interim dividends at this rate having been paid in September for the first half of the year.

The CHAIRMAN, in moving the adoption of the report and accounts, said: You will have seen that the sales of gas show a very satisfactory increase following the exceptional one in 1929, and this continued increase in sales is remarkable when I point out to you what is, perhaps, not appreciated—viz., that as a result of research work in recent years the efficiency of gas apparatus has been greatly improved, tending to reduce consumption. We now have 27,253 consumers, 602 having been added during the year, and we now supply on simple hire 36,499 cookers and fires. During the year a large number of cookers, gas fires, water heaters, and coke fires were sold outright or on hire-purchase.

The new gasholder was completed and brought into use in December. Some of you may have inspected it when in course of erection, and appreciate the magnitude of the work. I can assure you it is a sound engineering job, and reflects great credit on our Engineer, Mr. D. H. Helps, and the Contractors, Messrs. C. & W. Walker, Ltd. Additional purifying plant has been installed, and the works and plant have been maintained in excellent condition.

Mr. T. H. HEWETT (Deputy-Chairman) seconded the motion, which was carried unanimously.

Rochester Company Have Another Record Year.

Another record year for the Rochester, Chatham, and Gillingham Gas Company was reported at the Annual General Meeting of the Company, which took place at the Rochester Offices on Feb. 20. Alderman E. W. WILLIS, J.P., the Chairman of the Directorate, presided.

In moving the adoption of the report and balance-sheet, Alderman E. W. WILLIS said: During the year an issue of ordinary stock, amounting to £17,320, was made. Tenders were received for no less than £31,410, and the average price realized was £99 8s. 10½d. per £100. I am sure you will agree with me that this issue was a great success. In consequence of our laying additional mains to meet the needs of the district, and the erection of the new stores, &c., for the distribution department (which buildings, I think I can safely say, are second to none of their kind in the South of England), the capital expenditure, after allowing for depreciation, has increased during the year by £25,187.

Turning to the receipts side of the revenue account, you will see that the revenue from the sale of gas has increased by £4382. This, I feel, is most satisfactory. Coke has produced during the year £2022 more than in 1929, because coal has advanced in price, but tar shows a decrease compared with the previous year of £2388. The lessened demand for creosote and pitch abroad is to some extent responsible for the reduction in tar prices.

In bringing my remarks to a close, I think it well to say that those of us engaged in the Gas Industry are full of optimism. We realize that gas is now more than ever the greatest feature of industrial and domestic life. We have competition, but healthy rivalry is good. It creates that "urge" which is so necessary to ensure progress. Let us for one moment consider the progress this Company have made. The actual sales of gas in 1910 amounted to 448 million c.ft.; in 1920 they had risen to 705 millions, and in 1930 to 961 millions. That is a record which we are really proud of, and this year will be no exception, for the output of gas during the month of January was 8½ p.ct. in excess of the corresponding month of last year.

Mr. STEVENS seconded the adoption of the report and balance-sheet, which was carried.

A dividend at the rate of 6½ p.ct. was declared on the proposition of Mr. ELLIOTT, seconded by Mr. A. YOUNG (Auditor).

Scarborough Company's Increasingly Successful Trading.

The Annual Meeting of the Scarborough Gas Company was held at the Offices on Feb. 21, the CHAIRMAN, Mr. W. S. Rowntree, presiding, and being supported by all the Directors. Dividends of 5½ p.ct. on the ordinary stocks, the same as last year, and of 5 p.ct. on the preference stocks, were approved. The CHAIRMAN, after reviewing the increasing trade of the Company, made pointed reference to the attitude of the Corporation in connection with the use of gas on the Corporation housing estates, references also being made to this matter by several speakers.

The CHAIRMAN said: The capital expenditure has been somewhat above the average, as it has been necessary to meet the ever-increasing demand for gas by extending certain plant on the works and by laying additional mains for distribution. An innovation was also made by the large purchase of water heaters to let out on simple hire. Nevertheless, the capital expenditure per 1000 c.ft. is only 12s. 5d., compared with 13s. 9d. ten years ago and 16s. 4d. in 1910. It is gratifying that we are able to report a continued increase in the sale of gas last year, although some gas undertakings have so far reported decreased consumptions owing to the mild weather during the early months and the general depression throughout the country. In Scarborough we were also affected by the admittedly poor season, and to secure an increased sale in spite of these formidable conditions speaks well for the popularity of gas in our town.

We have recently made a special offer of enamelled cookers fitted with the latest improvements, including automatic oven heat control. As regards water heating by gas, we have placed on simple hire at a rental of only 6d. per month a small boiler capable of giving a constant supply of hot water at a low cost. Consumers have expressed great appreciation of these boilers, nearly 1800 having been fixed, and the large number of orders still being received are chiefly due to recommendations. I am also able to report very satisfactory sales of gas appliances during the year, as we sold 408 cookers, 981 gas fires, 478 washing coppers, and many other types of appliances.

The receipts for gas have been well maintained, together with the income for residuals, but one item of the latter—sulphate of ammonia—is disappointing. This shows a loss, which is in keeping with the returns of other undertakings and is due to the price having fallen heavily during the year. The expenditure on revenue shows an increase, chiefly confined to one or two items. For instance, nearly £1000 has been spent on repairs to gasholders, and under normal conditions it should not be necessary to incur further expense in this direction for many years. Repairing and renewing meters and stoves has cost the Company over £2000 more than in 1929, due to our policy that gas appliances generally and the Company's hired cookers in particular, should be improved and maintained in a condition as nearly perfect as possible, free of cost to the consumer.

The gross profit of £27,508 is carried to the profit and loss account, and after allowing for the interim dividend paid in August last and the interest charges, &c., the balance of net revenue is £14,822. As the price charged for gas has again been below the basic figure, the consumers have benefited to the extent of £14,011. One-sixth of this sum—viz., £2335—is, therefore, available for distribution to the stockholders. This is an increase on the year 1929, and is deficient by only £27 to allow a full additional 1 p.ct. of dividend to be paid. The Directors recommend, therefore, a dividend at the same rate as last year of 5¾ p.ct. per annum, and the undivided balance of £268 has been added to the reserve fund. If all goes well, a 6 p.ct. dividend should be possible next year.

According to the Act of 1927, a like amount of £2335 has been apportioned to the employees' profit-sharing scheme, and will be dealt with in a similar manner as last year. The surplus to carry forward after dealing with all these items will be £2403.

Mr. T. MOORE formally seconded.

Continued Progress of Ipswich Gas Light Company.

The continuation of over a century's progress in the gas undertaking in Ipswich and environments was satisfactorily reflected at the 110th Ordinary General Meeting of the Ipswich Gas Light Company—Mr. HENRY WOODALL, M.Inst.C.E., J.P., Chairman and Managing Director, presiding.

The CHAIRMAN said there had been an abnormal increase in the sale of gas for 1929, due to the unusually cold spring of that year; so that it was not surprising to find that owing to the mildness of the weather in the first quarter of 1930 the sale of gas had shown a slight decrease. The total quantity of gas sold stated in the accounts—765,609,000 c.ft.—actually showed an increase; but that increase was due to the quantity of gas consumed at Woodbridge being brought into the accounts for the first time. The increase at Woodbridge itself was equal to 6·9 p.ct. In order to show that business was expanding, he mentioned that there had been an increase in the number of consumers at Ipswich and Woodbridge of 742, and in Felixstowe of 99, making a total number of consumers within the three areas of 29,008.

Turning to the accounts, he pointed out that the largest item of capital expenditure had been on mains. The Company had redeemed £1140 5 p.ct. redeemable stock, leaving a balance of £7830 to be redeemed by the end of next year, unless the Directors invited the holders of the stock to leave their money in the Company and receive other stock in place of that to be redeemed. The total capital expenditure now exceeded half-a-million pounds, which was equal to £419 per million c.ft. sold.

On the receipts side there was an increase of £4195 from the sale of gas, which was attributable to Woodbridge. Coke, he stated, had done very well with an increase of £2231. This was partly due to the larger quantity sold and partly to economies resulting from the installation of a waste-heat boiler. Good trade in coke had been cultivated by specializing in qualities for domestic purposes and central-heating stoves. A feature of selling coke in 1s. bags had been made, and there had been delivered to customers' houses no fewer than 22,944 bags during 1930.

The total revenue had been £173,725 and working expenses £155,637, leaving a balance to be carried to profit and loss of £18,088. In addition to the £18,088 balance from Ipswich and Woodbridge, there was an amount of £3688 profit from Felixstowe, and the net result was that, after paying the full statutory dividend and adding to reserves £6838, the amount carried forward was £17,794—an increase of £722.

It was then proposed by the CHAIRMAN, and seconded by Mr. P. W. COBBOLD, that a dividend at the rate of £6 7s. 6d. p.ct. per annum on the consolidated stock, making a dividend for the year of £6 7s. 6d. p.ct.; at the rate of £5 p.ct. per annum on the redeemable stock; at the rate of £5 p.ct. per annum on the 5 p.ct. preference stock; and at the rate of £7 p.ct. per annum on the 7 p.ct. redeemable preference stock be paid, *less* income-tax. This was carried.

Tonbridge Gas Company's Progress.

A Year of Increased Sales.

The Annual Meeting of the Tonbridge Gas Company was held at the Offices, High Street—Mr. A. H. NEVE (the Chairman) presiding.

The CHAIRMAN, in moving the adoption of the report, said: I am happy to tell you that we have not only held our own in 1930, but we have passed 1929's record by several millions of cubic feet. You will infer, therefore, and you will be quite justified in inferring, that your Directors look forward to the future of the Tonbridge Gas Company with considerable confidence.

The total revenue shows an increase of some £2000, as compared with last year, and coke sales are £260 up. As contrasted with the experience of many other gas companies, our residuals are not at all disappointing, with the exception, perhaps, of sulphate of ammonia. As you are aware, the market is flooded with the synthetic product, and whereas the price within recent years was £20 a ton, it has now fallen to less than half that figure. Many companies are giving up the manufacture and allowing their ammoniacal liquor to run to waste. We are at present on the right side of the balance-sheet, but the future is not by any means certain or encouraging.

Turning to the other side of the revenue account, we find that our coal cost us considerably less, in spite of an increased output of gas, and this is due to the economy rendered possible by the new plant. The balance of the revenue account is £8353, as compared with just under £7000 a year ago. The increased amount will come in very handy to pay a dividend upon the increased capital recently issued.

In all the circumstances the Directors have no hesitation in recommending the adoption of these accounts, together with payment of dividends for the half-year ended Dec. 31 last, at the usual rates—viz., 14 p.ct. on "A" stock, 11 p.ct. on "B," "D," and "E" stocks, and 5 p.ct. on "C" stock, and I move this accordingly.

Mr. RUDD DAWES (Vice-Chairman) seconded the resolution, which was carried unanimously.

Gloucester Gas Light Company.

The Annual Meeting of the Gloucester Gas Light Company was held at the Offices, Eastgate Street—Mr. J. H. JONES (Chairman) presiding.

In moving the adoption of the report and statement of accounts, the CHAIRMAN said: "In turning to the report and statement of accounts before you, it is a matter for regret that they show a slight decrease in the consumption of gas. In the previous year we had the benefit of a good deal of cold weather, so the increase was out of the ordinary course. The decrease this year has been very little, while some large companies report a decrease of 2½ p.ct. We have, however, sent out many more cooking stoves, fires, and fittings of all sorts, which should be of benefit in the future. In regard to the revenue account, the receipts amount to £128,392. The sales of coke and tar have improved, but sulphate of ammonia has landed an actual loss of £286. The cost of manufacture this year amounts to £107,154, which includes the cost of the showroom, and the balance carried to the profit and loss account this year is £21,238. The cost includes £1754 carried to the profit-sharing fund, which increasingly proves its usefulness to employees and their families and establishes good understanding between all parties. The balance enables us to apply £3000 to the deferred renewals account, making this up to £5000, and the balance of net profit to be carried to next account (subject to the half-year's dividend to Dec. 31) is £13,191, as against £12,092 last year. The reserve fund of £20,477 is principally invested in £35,628 2½ p.ct. consols, so we may, as usual, consider the accounts satisfactory.

Last year you were told that increased gas storage was engaging our consideration, and we hoped to-day to have reported satisfactory progress, but time flies when arrangements have to meet the views of different authorities. An extraordinary meeting of proprietors to give consent to the necessary application to the Board of Trade was, as you will remember, held on June 11 last, but after this stage objections were raised by the Corporation of Gloucester and the County Council to the site which we had selected for the erection of the new gasholder. The Corporation urged the selection of another site, and we were advised on good authority that we could safely adopt that site instead of the one we preferred. All other questions arising on our application to the Board of Trade were settled, and we are now making an amended application, which we hope will go through without serious delay.

The DEPUTY-CHAIRMAN seconded the proposition, and the report and statement of accounts were adopted unanimously.

It was agreed to declare a dividend at the rate of 5 p.ct. per annum (*less* income-tax) for the half-year ended Dec. 31, 1930.

Cork Gas Consumers' Company.

The Ordinary General Meeting of the Cork Gas Consumers' Company was held at the Offices, 72, South Mall—Mr. WM. B. HARRINGTON, F.C.S. (Chairman), presiding.

The CHAIRMAN said: You may remember that when I addressed you last February I stated the sales of gas in the December half-year, 1929, exceeded those of 1928 by over 14¼ million c.ft., or over 8 p.ct. On the present occasion I can say that we have done better again, for the increase over the same period 1928 was 25¾ million c.ft., equal to 14¾ p.ct. Although our customers saved £4122 by the penny per therm reduction we made in the price of gas, there is a falling off of only £827 in the return from rental and public lighting, owing to the large increase in the quantity of gas sold. The returns from residuals were also very good, showing an increase of £2380 over last year's figures, a result mainly due to the still increasing demand for coke for industrial and domestic purposes. During the half-year we fixed 868 additional cooking and heating appliances, a number exceeding that of the corresponding periods in any previous year. A great proportion of this increase is due to the popularity of gas for cooking purposes owing to its reliability and economy. A glance at the number of gas cookers sold during the past four years proves that the popularity of gas as the most dependable cooking agency is increasing year by year owing to the satisfaction which follows its installation in the household—for instance, during the year 1927 we sold 502 cookers, 1928 we sold 623, 1929 we sold 785, and 1930 we sold 1064 cookers. It is particularly noticeable that ladies who have used gas for cooking, and who for any reason wish to change their residence, always inquire if they can have gas supplied to the home they proposed to buy or rent, and in many instances the impossibility of getting gas has made a house almost unsaleable.

Mr. O'REGAN proposed that a dividend at the rate of 8 p.ct. per annum be declared for the half-year ended Dec. 31, 1930, on the paid-up capital of the Company.

This was seconded by Mr. J. TRACEY, and adopted unanimously.

Chichester Gas Company.

A very optimistic outlook was presented by Mr. Joseph Cash, presiding at the Annual Meeting of the Chichester Gas Company, which was held at the Offices of the Company. The meeting was the first held under the provisions of the Chichester Gas Order, 1930, which provides for an annual general meeting in place of the two half-yearly meetings as hitherto.

The CHAIRMAN said: Taking the capital statement first, we

have expended during the year £1774, chiefly on account of new buildings, mains, and meters; we have, however, depreciated our plant and meters by £1158, so that the net increase in the capital of the undertaking stands at only £615. The revenue account is satisfactory. We sold 69,031,000 c.ft. of gas, against 68,723,000 c.ft. for the previous year. Manufacture of gas cost £13,647 this year, against £13,424 last year, due to an increase in repair works, which shows that the maintenance of plant has been looked after. Distribution is a little less than last year. On the other side of the account the sale of gas reflects the small increase I mentioned. The return for coke is satisfactory, due largely, I think, to the fact that the public realize that in "Chichester gas coke" they have a valuable and reliable fuel. Tar reflects the heavy fall in the price per gallon common to all gas companies. The outcome is a profit of £4637, which is about the same as last year.

In seconding the adoption of the report, Mr. RITSON said he thought it was very satisfactory. They had been compelled to undertake urgent repairs that would carry them on for years to come. These had had to stand over for some time owing to the war and the general strike and other causes.

The report was adopted.

Further Company Results in 1930

Alnwick.

At the Annual Meeting of Alnwick Gas Company the Chairman, Mr. R. Kyle, referred to the satisfactory results of the past year's working, notwithstanding a decrease in the price of gas. A balance of £3293 was available, and dividends equal to 12½ p.ct. on the "A" stock, 9 p.ct. on the "B" stock, and 6 p.ct. on the preference stock for the year were agreed to.

Barnstaple.

Presiding at the Annual Meeting on Feb. 25 of the Barnstaple Gas Company, Mr. F. W. Hunt, Chairman of Directors, said the outlook in the coal trade was anything but promising, and it was in the highest degree unfortunate that the industry should again have been subjected to Parliamentary interference through the Coal Mines Act. Dealing with the position of the Company, Mr. Hunt said that, notwithstanding a year of general trade depression, it had continued its progressive career, and the previous year's record sales of gas had been exceeded by 2,907,400 c.ft. The price of gas throughout the year had been 10d. per therm, or 4s. 2d. per 1000 c.ft., which was only 25 p.ct. above the pre-war level, whereas coal was still something like 80 p.ct. above. They had laid out a considerable sum of money in view of the continued growth of the business on the reconstruction of the offices and building an attractive and commodious front showroom which provided for the effective display of ranges, gas cookers, and other supplies; and they had constructed a new gasholder capable of holding 300,000 c.ft. of gas, in place of a holder accommodating only 100,000 c.ft. The capital account was overdrawn to the extent of £6781, which would necessitate an issue of shares at an early date. During the year the Company had carbonized 6493 tons of coal and made 91,450,000 c.ft. of gas, 4090 tons of coke, 69,872 gallons of tar, and 40 tons of sulphate of ammonia. The Directors recommended a dividend at the rate of 13 p.ct. per annum on the "A" shares and £9 2s. p.ct. on the "B" shares, both less income-tax. This recommendation was agreed to.

Bath.

An interim maximum dividend at the rate of 5 p.ct. per annum, less income-tax, was paid by the Bath Gas Company in August last for the half-year to June 30, 1930, and the Directors recommend the declaration of a dividend at the same rate, less income-tax, for the half-year ended Dec. 31, 1930. Application has been made to the Board of Trade for an Order authorizing the completion of the provisional agreements entered into with the Chippenham Gas Company and the Corsham Gas Company, Ltd., and it is hoped the application will be considered by the Board of Trade at an early date.

Bishop's Stortford.

The sale of gas by the Bishop's Stortford, Harlow, and Epping Gas and Electricity Company for the year, 907,787 therms, is 2·82 p.ct. less than that for the preceding year. The balances carried from the revenue accounts (gas and electricity) to the credit of the profit and loss account amount to £13,275. Adding thereto £67 received for interest, and £5478 brought forward from the preceding year, and deducting therefrom interest, income-tax, and other charges, and transferring £134 to the reserve fund, leaves £18,718 available for distribution. Interim dividends for the half-year ended June 30, 1930, were paid as follows—viz., on the "A" ordinary stock, at the rate of £7 2s. p.ct. per annum; on the "B" ordinary stock, at the rate of £6 10s. p.ct. per annum; on the "C" 5 p.ct. preference stock, at the rate of £5 p.ct. per annum; and on the "D" 4 p.ct. preference stock, at the rate of £4 p.ct. per annum (all *less* income-tax); and the Directors now recommend the declaration of dividends for the half-year ended Dec. 31, 1930 (being final dividends for the year), at the same rates (all *less* income-tax). They also recommend the declaration of a dividend at the rate of £5 10s. p.ct. per annum (*less* income-tax) on the new issue of "E" 5½ p.ct. preference stock, for the five months ended Dec. 31, 1930. These appropriations amount to £8465, and leave a balance of £5253 to the credit of the profit and loss account to be carried forward.

Cleethorpes.

Presiding at the Annual Meeting of the proprietors of the Cleethorpes Gas Company, Sir George Moody, J.P. (Chairman and Managing Director), said the accounts showed steady progress in the past year. Gas sales had increased, and good results had been obtained from the modernized plant. The Company was now supplying 12,970 consumers with gas through 55 miles of mains. He was pleased to see that vigorous protests had been lodged by the leaders of the Gas Industry against the unwarranted Government propaganda in favour of the electrical industry, and the financing by public money of the so-called "assisted wiring schemes." It was the duty of Ministers of the Crown to act impartially to all industries, and not to operate as advertising agents for one or another.

Dorchester.

In submitting the statement of accounts for the year ended Dec. 31, 1930, the Directors of the Dorchester Gas and Coke Company, Ltd., report a further expansion in the sale of gas, the increased consumption being 2,481,600 c.ft., or 3·4 p.ct. Owing to the sustained demand it has been necessary to increase the storage capacity, and an additional gasholder is now in course of construction. The consumers will participate in this prosperity, and will benefit both by the reduction in the price of gas and by the increase in the discounts allowed for the prompt settlement of accounts. The Directors on July 1 last reduced the price of gas from 11·11d. to 10·66d. per therm, or 2d. per 1000 c.ft., this making the price equivalent to 4s. per 1000 c.ft.; the increased sales resulting have more than covered the cost of the reduction. The balance at the credit of the net revenue account is £1324, out of which the Directors recommend the payment of a final dividend of 10 p.ct. on the ordinary capital, free of income-tax, and 6 p.ct. on the preference capital, *less* income-tax.

East Grinstead.

The Annual General Meeting of the East Grinstead Gas and Water Company was held at the Offices of the Company, London Road, East Grinstead, on Feb. 25. Mr. W. H. Hills (Chairman of the Directors) presided. The Chairman, in moving the adoption of the report and declaration of the recommended dividends (*i.e.*, £5 p.ct. on the original "A" stock and "A" shares, and £3 10s. p.ct. on the "B" and "C" shares—*less* income-tax—which, with the interim dividend paid out on Sept. 1 last, will make £10 and £7 p.ct. respectively for the year), said: The profits earned by both gas and water departments of the Company are higher than last year, and we are able to recommend the payment of full dividends in accordance with our statutory powers and yet still increase the balance to be carried forward to £7768, an improvement of £226. The capital account of the Company now stands at £127,259, which is an increase during the present year of £12,800, brought about by the erection at the gas-works of the new gasholder and various capital items of extension of gas and water mains and services. We have added during the year 103 new gas consumers, bringing the total up to 2803. The quantity of gas sold during the year is the same as in 1929, and taking into account the mildness of last year compared with the year before, which was a record year for gas sales, this is satisfactory. We have sold and fixed the following new gas apparatus during the year: Cookers, 110; fires, 125; wash-boilers, 50; radiators, 64; geysers, 15; and the number of lighting fittings sold and fixed under our maintenance scheme is an indication that gas lighting is to-day in East Grinstead holding its own against its competitors. Mr. J. Donaldson, seconding, commented on the favourable outlook presented by the balance-sheet. A pleasant feature of the accounts was the drop in the amount of unaccounted-for gas. It had dropped from 9·3 p.ct. to 7·6 p.ct., a reduction of 1·7 p.ct., which was very favourable when they worked it out on a make of 100 million c.ft. of gas sold.

Great Yarmouth.

The Annual Meeting of the shareholders of the Great Yarmouth Gas Company was held in the Board Room at the Company's Offices, Great Yarmouth, on Monday, Feb. 16. The Chairman, in moving the adoption of the report and accounts, said: The profit for the year, after allocating £5000 to the cost of deferred renewal of the second section of the carbonizing plant, is £8524, as against £9416 last year, when £3084 only was allocated to deferred renewals of plant. The renewal during the year of the second section of the carbonizing plant which the Company have not been in a position to undertake until now marks the end of the reconstruction work planned several years ago. Reviewing the expenditure side of the revenue account, coal,

oil, and coke have cost us £858 less than last year, which is largely due to a reduction of more than 3¼ million c.ft. in the production of gas, although there is only a reduction of less than half a million c.ft. in the gas sold. Purifying costs show a reduction of £93, but this is accounted for by a sale of spent oxide amounting to approximately £100 which has gone to the credit of the account. The total cost of manufacture shows a reduction of £960 on the year. Distribution charges are slightly less than last year. The total expenditure during the year, after deducting the £5000 for deferred renewals of carbonizing plant, amounts to £45,397, and the corresponding figure for last year after deducting the £3085 expenditure on deferred renewals was £45,895, this year's expenditure showing a decrease of £498. The sales of gas show a slight decrease of 497,000 c.ft. as compared with last year. The sales of gas for fish and potato frying have increased during the year by nearly 3 million c.ft., or 35·4 p.ct., and now total for 1930 11,394,000 c.ft.

Hexham.

The report of the Hexham-on-Tyne Gas Company for the past year shows a gross profit of £3463. A final dividend of £3 10s. p.ct. (less tax) on the ordinary stock, making with the interim dividend paid in September last 6 p.ct. for the year, is recommended, and that the balance of £1464 be carried forward.

Leighton Buzzard.

It is satisfactory to see that the balance-sheet again shows a small increase in the profit on the year, and that we are able again to recommend a dividend of 6 p.ct. and to carry £244 to the reserve fund, said Mr. R. Richmond, presiding at the Annual Meeting of the Leighton Buzzard Gas Company. In the capital account, continued the Chairman, the expenditure on new mains, meters, and stoves is practically balanced by the amounts written off for depreciation, and the only increase is the cost of the new showrooms. There is an increase of nearly 1 p.ct. in the gas sold—not a large quantity, but very satisfactory considering the general depression in trade, the mild weather in comparison with 1929, and the electricity competition. During the year the number of consumers has increased by 71—15 ordinary and 56 prepayment. The following additional appliances have been installed: 128 cookers, 108 fires, and 95 wash-coppers and geysers. I now propose that the audited statement of accounts be received and adopted, and that a dividend of 6 p.ct., *less* income-tax, be paid for the past year.

Matlock.

The revenue account of the Matlock and District Gas Company shows a profit of £4347. To this has to be added the unappropriated balance from the previous year £18,908, making together £23,256. Against this has to be charged the interim dividend (less tax) paid in August last, amounting to £1042, and debenture interest for the year, amounting to £390, leaving for disposal £21,823. This sum the Directors recommend shall be applied in the following manner—viz., by paying a dividend for the half-year ended Dec. 31, 1930, at the rate of 11s. 8d. per share on the paid-up capital of the Company (making £8 6s. 10½d. p.ct. for the year, less tax), and by carrying forward to the current year the balance of £19,390.

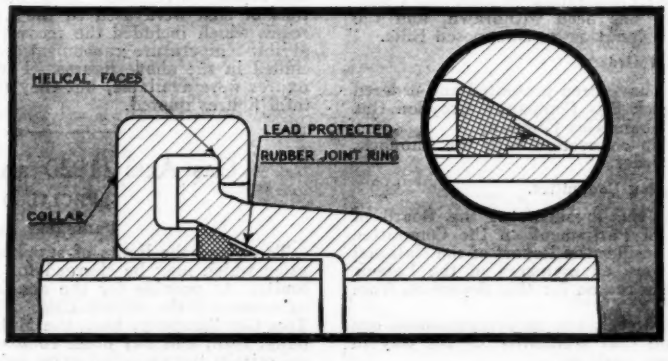
Narborough.

The Directors of the Narborough, Blaby, Enderby, and Whetstone Gas-Light and Coke Company submit the following report for the year ended Dec. 31, 1930. Although trade generally, in the district served by the Company has been depressed more or less during the whole period covered by these accounts, it is gratifying to report that the sales of gas have further increased by a million cubic feet, and the number of consumers by 87. Considerable renewals and extensions of mains have taken place on the district, and the chief expenditure in this department has been incurred in putting down large trunk mains from Whetstone to Blaby, and Narborough and Enderby cross roads. The Directors recommend that a final dividend of 2s. 6d. per share be paid on the ordinary shares, making with the interim dividend paid on Aug. 30 last, 10 p.ct. per annum, together with a bonus of 2s. 6d. per share, both less tax, transfer £1000 to the renewals fund, and leaving to be carried forward the sum of £7883.

Newmarket.

The Annual Meeting of the Newmarket Gas Company was held at the Company's offices on Feb. 23—Mr. J. H. Troughton, M.Inst.Gas E., J.P. (Chairman and Managing Director), presiding. The Directors' report was as follows: The balance brought forward from last year is £5200, less debenture interest paid for the year 1930, £162 10s., leaving £5037; the profit earned during the year ended Dec. 31, 1930, is £5708, making a balance at the credit of profit and loss account of £10,746. The Directors recommend that out of this amount a dividend be paid at the rate of 8¾ p.ct. for the year 1930 upon the £65,000 original consolidated stock of the Company, less income-tax, leaving to be carried to next year's account £6338. The sale of gas has been well maintained during the year, but residuals have not realized as much as in former years, and it no longer pays to manufacture sulphate of ammonia. The Chairman said that their coal bill was down £150 as compared with 1929. That was accounted for by their dipping into the coal reserves, and, apparently, by their not having used quite so much coal

STANTON-WILSON
NEW GAS-TIGHT PIPE JOINT



WITHSTANDS EFFECTS OF GROUND SUBSIDENCE AND TRAFFIC VIBRATION

THE STANTON IRONWORKS COMPANY LIMITED NEAR NOTTINGHAM

as they did in 1929. They had made more gas per ton of coal carbonized in 1930 than in 1929. The total amount of gas which came on the other side was £214 less than in 1929. Minor economies had been made on the debtor side under manufacture and distribution of gas. Generally speaking, the accounts were very much as last year. Coke had brought in less than in 1929, partly on account of their carbonizing less coal, and partly on account of their obtaining less money for it. They were at present putting down machinery for cutting and grading coke to suit their customers.

Romford.

The Ordinary General Meeting of the Romford Gas Company was held at the Company's Offices on Feb. 28—Mr. Bevous J. Smith, Chairman of the Board of Directors, presiding. The Chairman said: Pursuing their consistent policy of reducing the price of gas to consumers whenever circumstances permit, the Directors announced in June last that as from midsummer a reduction of 1½d. per 1000 c.ft. would apply, which means a considerable annual saving to our customers. A reasonably low price for our commodity is a great factor to-day, and the fact that 2728 additional consumers have been connected to the Company's mains during the past twelve months and a further 2910 gas appliances brought into use is distinct evidence of the public's appreciation of the services offered by this Company. In many parts of the country gas undertakings have experienced decreased sales owing to the varying climatic conditions prevailing during 1929 and 1930; in our case we are in the happy position to report an increased sale of over 14 million c.ft., or 10·37 p.ct., notwithstanding the influences I have mentioned. The profit for the year added to the balance brought forward from 1929 gives a total of £26,179, and after paying debenture interest, bank interest, income-tax, and other charges, including the interim dividend to June 30, 1930, there remains a balance of £12,188, out of which it is recommended that dividends amounting to £6826 be paid, leaving a carry forward balance of £5361, as compared with £3906 at the beginning of 1930.

Southampton.

The Southampton Gaslight and Coke Company's business continues to expand, the consumption of gas for the year amounting to 1,542,709,200 c.ft.—an increase over the preceding year of 57,512,300 c.ft. To cope with the increasing demand, it is necessary to augment the Company's manufacturing plant, and an order has been placed for an installation of intermittent vertical chamber ovens. The Company's mains were extended last summer to supply Marchwood, Dibden, and Hythe. Throughout the year a total length of 25 miles of additional mains was laid. The total mileage is now 333. Interim dividends at the full statutory rates were paid, less tax, on Sept. 1 last, and the Directors now recommend that final dividends at similar rates be paid, less income-tax, for the half-year ended Dec. 31, 1930.

Sutton.

Sales of gas by the Sutton Gas Company show an increase of 6·62 p.ct. over those for the year 1929. The balance carried to profit and loss account, after crediting £1000 to the special purposes fund, is £21,036. Expenditure upon capital account, principally in respect of new mains, amounted to £19,166. In May last, £26,672 5 p.ct. perpetual debenture stock was issued at the price of £98 p.ct. An interim dividend of 4 p.ct. was paid on Aug. 1 last, and the Directors now recommend the payment of a final dividend of 4 p.ct., making 8 p.ct., *less* income-tax, for the year.

PARLIAMENTARY INTELLIGENCE

[From Our Special Correspondents.]

House of Lords.

Private Bills.

The opposition to the Lowestoft Water and Gas Bill having been withdrawn, the Select Committee appointed to consider it has been discharged, and the Bill has been referred to the Committee on Unopposed Bills.

The Royston and Brodsworth Gas Bill has been withdrawn from the Select Committee to which it was previously referred, and transferred to another Select Committee.

Lord Templemore has withdrawn from the Select Committee to which the Gas Light and Coke Company Bill is referred, and Lord Suffield has been appointed in his place.

House of Commons.

Private Bills.

The petition of the Wessex Electricity Company against the Aldershot Gas, Water, and District Lighting Bill has been withdrawn.

The petition of the Guildford Corporation against the Guildford Gas and Electricity Bill has been withdrawn, and the Bill has been referred to the Committee on Unopposed Bills.

Special Orders.

The following Special Orders have been presented and ordered to lie upon the table: Alnwick Gas Company; Croydon Gas Company; Watford and St. Albans Gas Company.

Plans have been deposited in connection with the Cannock, Brownhills, and District Gas Order.

Gas Legislation Committee.

Captain CROOKSHANK asked the President of the Board of Trade if the three Members of Parliament on the Committee which has been appointed to consider the Report of the National Fuel and Power Committee were all members of the Labour Party, and, if so, what was the reason for this departure from precedent.

Mr. GRAHAM said this was correct, but they represented one side of the Gas Industry; and that accounted for the way in which this Committee had been made up.

Captain CROOKSHANK asked if it was not customary, when Members of the House were put on a Committee, that they should be taken from all parties, and not only from one party.

Mr. GRAHAM said he did not think they were chosen as Members of the House at all, but to represent both sides of the Industry.

Coke Oven Development.

Major GLYN asked the Secretary for Mines what had been the development of coke oven plant in England and Wales; if he was aware of any instances where gas was being pumped under pressure from such plants to large cities; and whether the sale of coke and bye-products under the existing conditions of industrial depression showed a profit in working the plants.

Mr. SHINWELL gave the following reply: Statements made in the report of the Departmental Committee on Area Gas Supply issued in March, 1930, indicate that coke oven development has tended towards an increase of oven capacity and the erection of central coking plants serving several collieries. A further development is the substitution of beehive ovens by bye-product recovery ovens. Thus, in 1913, of the total coal carbonized at coke ovens in England and Wales, 53·7 p.ct. was carbonized at bye-product ovens, whereas in 1929, the latest year for which information is at present available, the proportion was 95·6 p.ct. In 1929, 10,125 million c.ft. of coke oven gas was purchased by 29 gas undertakings. A list of these undertakings is given in Part I. of the Board of Trade Return relating to all authorized gas undertakings in Great Britain for the year 1929. I have no information regarding the last part of the question.

Bye-Products of Coal.

Mr. ROSBOTHAM asked the Secretary for Mines the tonnage of coal used in the production of bye-products for the years 1928, 1929, and 1930.

Mr. SHINWELL said that the figures for 1930 were not yet available. The amount of coal used at gas-works and bye-product coke ovens was approximately 34,500,000 tons in 1928 and 37,500,000 in 1929. In addition, several hundred thousand tons of coal were used in the production of pig-iron by processes which included the recovery of bye-products. Coal used at low-temperature carbonization plants at gas-works was included in the above figures. For plants situated elsewhere no figures were available, but they would not materially affect the total figures quoted.

Gas Acts (1920 and 1929) Orders.

SPECIAL ORDERS.

Darlington Corporation.

To extend the limits of supply; to make provision as to the price which may be charged for gas in the proposed extended limits; to provide for the acquisition by the Corporation by agreement of the undertakings of the Croft and Hurworth-upon-Tees Gas Company, Ltd., the Middleton and Dinsdale Gas Company, Ltd., and any other company, body, or person supplying gas within the proposed extended limits; to authorize the Corporation and any local authority, company, or person to enter into and carry into effect agreements as to the supply by or to the Corporation of gas in bulk, and to confer other powers upon the Corporation.

North Middlesex Gas Company.

To authorize the establishment of pension schemes, to make provisions as to the sale of stock, &c.

Portsmouth Gas Company.

To authorize the Company to acquire additional lands at Hilsea, and to manufacture and store gas, &c., on these lands.

Trade Notes

Meter Order for Brazil.

Messrs. Joymanco (Brighton), Ltd., of Hove, have recently received a large order for their patent meter diaphragms for shipment to a large undertaking in Brazil.

Tully Plant for Muirkirk.

The Muirkirk Gas Light Company, Ltd., have placed an order with Messrs. Tully, Sons, & Co., Ltd., for one of their latest types of plant, of 75,000 c.ft. per day capacity, complete with mechanical operator and automatic ash rake.

A Booklet for Motorists.

A publication which Messrs. Alexander Duckham & Co., Ltd., of 16, Cannon Street, E.C. 4, are offering free to motorists who care to apply, is a guide to the better lubrication of the petrol engine. Included in the booklet is an extremely useful sectional road map of England, Wales, and Southern Scotland.

Orders for Messrs. Broadhead Constructions, Ltd.

An order has been placed with Messrs. Broadhead Constructions, Ltd., of Manchester, for an installation of overhead purifiers, together with oxide handling plant, cast-iron tar and liquor tank, &c., by the Lancaster Corporation Gas Department. A further order has been placed with the firm for a coke screening and storage plant by the Thornton Cleveleys Urban District Council.

Steel Gas Pipes.

From Messrs. Stewarts & Lloyds, Ltd., we have received their March stock list of steel gas pipes, which also contains illustrations of spigot and socket joints for steel gas mains and a 16-in. high-pressure gas main with Stewarts' welded joints. From this it can be seen that these joints when driven together are able not only to keep themselves in proper position for welding without any special fastenings, but also to carry the weight of the welder. In the completed joint the weld acts as a seal, the spigot and sleeve taking any bending stresses.

How to Recognize British Steel.

British steel can now be identified by a special mark which manufacturers have adopted in order to safeguard customers who desire to obtain British steel of British standard quality. This mark definitely guarantees that the steel is British, produced and rolled in this country by British labour. The presence of the British steel mark on the steel supplied indicates the fulfilment of the conditions of the contract. In this connection, the British Steelwork Association as a non-profit-earning organization, are prepared to render service, or to give advice, technical or otherwise, to all who are interested in the use of steel or steelwork.

The World's Largest Liner.

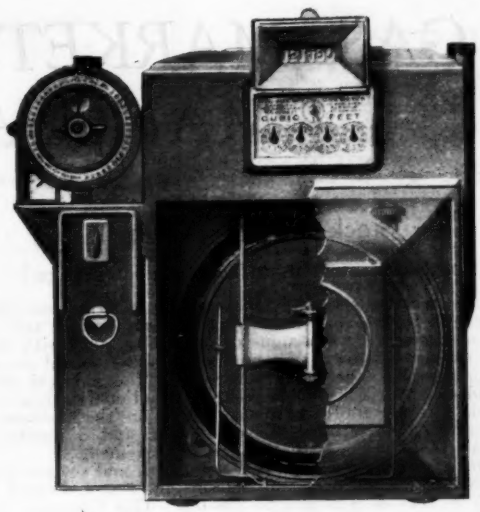
The British Thomson-Houston Co., Ltd., of Rugby, have received an order for the seven turbo-generators which will be required for the auxiliary services on the giant Cunarder now being built at Clydebank by Messrs. John Brown & Co., Ltd., for the Cunard Steamship Company's express passenger service between Southampton and New York. This liner will be over 1000 ft. long and have a displacement of over 70,000 tons, so that she will be by far the largest ship in the world.

Each of the B.T.H. turbo-generators will be rated at 1800 KW. (normal) 225 volts, with an overload capacity of 25 p.ct. for two hours and 50 p.ct. for five minutes. The combined normal capacity is therefore 9100 KW., which is sufficient for the needs of a moderate sized town. Each set will comprise a B.T.H. 10-stage turbine driving a B.T.H. direct current generator through B.T.H. single reduction gearing, the speed of the turbine being 5000 r.p.m. and the speed of the generator 600 r.p.m. The sets are of the combined turbine and condenser type in which the condenser is integral with the turbine, thus enabling the whole unit to be on the one floor level. Four of the sets are designated "Main machinery sets" and three "Hotel service sets."

Pontardulais Gas Company, Ltd.

A petition for the compulsory winding up of the Pontardulais Gas Company, Ltd., came again before Mr. Justice Maughan in the Chancery Division on March 4. Mr. Wynn Perry explained that the motion had been standing over for a long time to enable the Company to sell its undertaking to a Mr. Evan Williams. That sale was now nearly complete, and it had been agreed that the petition should be withdrawn, and no Order should be made as to costs, on the Company undertaking to go into voluntary liquidation as soon as the transfer was completed.

His Lordship said the Company itself could not go into voluntary liquidation, but a meeting of shareholders could be called for passing an agreement to that effect. He would make an Order dismissing the petition on an undertaking that that would be done.



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GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The new account opened last week with a firm tone which continued up to the close on Friday. It was evident that the volume of business showed signs of increasing, and, with stock in short supply, the prices of a number of issues gained ground. India loans were appreciably affected by the political situation, and other British Funds recorded fractional increases on the week. Home Railway stocks rallied on the outcome of the award of the National Wages Board; and a number of industrials also shared in the general improvement.

Gas stocks and shares were well supported, and several issues established sharp improvements. Maidstone 5 p.ct. headed the list with a gain of 8 points to 128-133. This Company have tributed 8½ p.ct. for the year to June since 1922-23; but as from Jan. 1 this year accounts will be made up to December, and for 1930 a final dividend of 4½ p.ct. was paid to June and a dividend of 4½ p.ct. for the December half-year, making 9 p.ct. for the year. The yield on the latter basis at the current price works out at £6 17s. 11d., which is rather high for this class of security. The issue, however, is a comparatively small one, and the stock, being closely held, rarely comes into the market (the last recorded transaction was in August last at 125), so that few opportunities occur for price changes. Among other increases last week were Imperial Continental with a gain of 5 points to 350-370; Portsmouth 4 p.ct., a further 2 points to 122-127; and South Suburban ordinary 2 points to 101-104. There was a further batch of *ex* div. markings last week, and it is interesting to note that in several cases—*e.g.*, Bournemouth, North Middlesex, and Sutton—no reduction in price was made, while Barnet ordinary gained 3 points to 115-120 *ex* div. The only fall was that of Oriental, Ltd., by 4 points to 100-105.

Recent new issues have met with considerable response. Among these, the Portsmouth Company's issue of £80,000 additional ordinary stock at a minimum of £123 realized £126 6s. p.ct., and tenders for the £51,000 5 p.ct. perpetual debenture stock of the Oxford and District Gas Company ranged from £103 down to the minimum of £98, the average price obtained being £99 3s. 11d. p.ct.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *March* 9.

The values of tar products remain unchanged, and are as follows:

Pitch, 45s. per ton f.o.b.

Creosote, for export, about 5½d. per gallon f.o.b.

Pure toluole, 1s. 11d. per gallon; pure benzole, about 1s. 8d. per gallon; solvent naphtha, 95/160, about 1s. 5d. per gallon; and pyridine bases, 3s. 6d. to 3s. 9d. per gallon.

All prices of spirits are *ex* sellers' works.

Tar Products in the Provinces.

March 9.

The average prices of gas-works products during the week were: Gas-works tar, 17s. 6d. to 21s. 6d. Pitch—East Coast, 42s. 6d. to 43s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 42s. 6d. to 43s. f.o.b.* Toluole, naked, North, 1s. 6½d. to 1s. 7¼d. Coal-tar crude naphtha, in bulk, North, 6¾d. to 7½d. Solvent naphtha, naked, North, 1s. 2d. to 1s. 2½d. Heavy naphtha, North, 11d. to 1s. Creosote, in bulk, North, liquid and salty, 3¼d. to 3½d.; low gravity, 1¼d.; Scotland, 3½d. to 3¾d. Heavy oils, in bulk, North, 5⅜d. to 5⅞d. Carbolic acid, 60's, 1s. 1d. to 1s. 2d. Naphthalene, £10 to £12. Salts, £3 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *March* 7.

Any orders being received are for comparatively small quantities, and stocks do not show much alteration during the week. The reduction in price of petrol has had an adverse effect on tar spirits.

Pitch.—There is a lack of orders, and prices are nominal at 42s. 6d. per ton f.o.b. Glasgow for export, and about 42s. 6d. per ton f.o.r. works for home trade.

Refined tar to Ministry of Transport Specification is being inquired for in considerable quantities. Quotations are unaltered at 2½d. to 2¾d. per gallon for prompt, and 2¾d. to 3d. per gallon for forward, both f.o.r. naked.

Creosote.—Some forward business is being arranged in the better grades. B.E.S.A. Specification is 2¾d. to 3d. per gallon; low gravity, 3⅜d. to 3⅝d. per gallon; and neutral oil, 3d. to 3⅛d. per gallon—all f.o.r. makers' works in bulk.

Cresylic.—Little movement is noticeable in this product. Pale, 97/99 p.ct., is 1s. 6d. to 1s. 7d. per gallon; dark, 97/99 p.ct., 1s. 5d. to 1s. 6d. per gallon; and pale, 99/100 p.ct., 1s. 8d. to 1s. 9d. per gallon; all *ex* works.

Crude naphtha.—Quotations are unchanged at 4d. to 4½d. per gallon f.o.r. works in bulk.

Solvent naphtha.—Values are lower, but orders are scarce. 90/160 is 1s. 2d. to 1s. 3d. per gallon, and 90/190, about 1s. per gallon.

Motor benzole.—Business is dull, and value is now about 1s. 2d. to 1s. 3d. per gallon in this area.

Pyridines.—90/140 grade is 3s. 6d. to 3s. 9d. per gallon, and 90/160, about 3s. to 3s. 3d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole:

	s. d.	s. d.	
Crude benzole	0 5½ to	0 6½	per gallon at works
Motor ,, ...	1 0 ,,	1 1	,, ,, ,,
Pure ,, ...	1 5½ ,,	1 6½	,, ,, ,,

New Capital Issues.

Preston Gas Company.—Tenders for the £93,000 5 p.ct. preference stock of this Company must be lodged with the Company on or before March 14. Particulars were advertised in last week's issue of the "JOURNAL."

Oxford and District Gas Company.—The tenders for the £51,000 5 p.ct. perpetual debenture stock, which were offered on behalf of the Directors of this Company, were opened on March 5. They amounted to a total of £69,397, and ranged from £103 per £100 down to the minimum of £98, the average price obtained being £99 3s. 11d. p.ct.

Bognor Gas and Electricity Company.—As will be seen from our advertisement columns, Messrs. A & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender, on behalf of the Directors of the Bognor Gas and Electricity Company, an issue of £30,000 5½ p.ct. redeemable debenture stock (to be redeemed at par on Dec. 31, 1950) at a minimum price of issue of par. Tenders, which must be in multiples of £50, must be received not later than 11 o'clock on Thursday, March 19.

Contracts Advertised To-Day.

Coal.

The Borough of Leigh (Lancs.) invite tenders for the delivery of gas nuts and slack. [Advert. on p. 674.]

Coke Grading and Crushing Plant.

The Chelmsford Corporation invite tenders for the supply and erection of coke grading and crushing plant. [Advert. on p. 674.]

Gasholder.

The Gas Department of the County Borough of Stockport invite tenders for a spiral-guided gasholder. [Advert. on p. 674.]

Tar.

The Gas Committee of the Manchester Corporation invite tenders for the purchase of gas tar. [Advert. on p. 674.]

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Mar. 6.	Rise or Fall on Week.	Transact'ns Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Feb. 5	5	5	Aldershot 5 p.c max. C.	73–78	..	..
522,992	,,	,,	4	4	Do. 4 p.c. Pref.	75–80	..	..
1,551,868	,,	Oct. 9	7⅛	7⅛	Alliance & Dublin Ord.	100–105	..	101½–102½
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	70–75	..	..
522,655	,,	Mar. 5	7	7	Barnet Ord. 7 p.c.	115–120*	+3	16/8
300,000	1	Oct. 23	1/7½	1/4½	Bombay, Ltd.	15/–17/–	..	..
174,500	10	Mar. 5	9	9	Bournemouth 5 p.c.	14½–15½*	..	..
500,050	10	,,	7	7	Do. B 7 p.c.	12½–13*	..	..
489,160	10	,,	6	6	Do. Pref. 6 p.c.	10½–11½*	–½	11¼–11⅜
50,000	Stk.	Dec. 18	8	8	Do. 8 p.c. Deb.	60–63	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	81–84	..	..
357,900	,,	Aug. 28	7½	7½	Brighton & Hove 6 p.c. Con.	112–117	..	..
871,880	,,	,,	6½	6½	Do. 5 p.c. Con.	102–105	..	..
1,287,500	,,	Feb. 19	5	5	Bristol 5 p.c. max.	93–95a	..	..
120,420	,,	Dec. 18	—	—	Do. 1st 4 p.c. Deb.	78–80	..	..
217,870	,,	,,	—	—	Do. 2nd 4 p.c. Deb.	78–80	..	..
328,790	,,	,,	—	—	Do. 5 p.c. Deb.	95–97	..	..
855,000	,,	Sept. 25	8	7	British Ord.	110–115	..	114
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	109–114	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	74–77	..	..
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	92–97	..	93½–95¼
160,000	,,	Jan. 8	5	5	Cambridge 5 p.c. Deb.	95–98	..	..
100,000	10	Dec. 4	10	6	Cape Town, Ltd.	9½–10½	+½	10–10⅛
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref.	6½–7½	..	..
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb.	72–77	..	..
626,850	,,	Feb. 19	6	6	Cardiff Con. Ord.	95–98	..	..
287,880	,,	Jan. 8	7½	7½	Do. 7½ p.c. Red. Deb.	97–100	..	..
157,150	,,	Feb. 19	5	5½	Chester 5 p.c. Ord.	83½–88½b	..	..
98,936	1	Oct. 9	†2/–	†2/–	Colombo, Ltd. Ord.	32/–34/–	..	..
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	18/–20/–	..	..
609,204	1	Oct. 9	1/9½	1/4½	Colonial Gas Assn. Ld. Ord	16/6–18/6	..	..
296,053	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	18/–20/–	..	..
2,078,280	Stk.	Feb. 19	6	6	Commercial Ord.	93–96	..	94–95
475,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb.	57–60	..	57¼
787,560	,,	Feb. 19	7	7	Croydon sliding scale	106–109	..	108½–109
453,100	,,	,,	5	5	Do. max. div.	82–85	..	83–84
542,270	,,	Mar. 5	7	10	Derby Con.	120–123a*	–1	..
55,000	,,	Dec. 18	4	4	Do. Deb.	65–70a	..	..
209,000	,,	Mar. 5	5	5	East Hull Ord. 5 p.c.	72–75*	..	..
1,002,180	,,	Sept. 25	†7g	†4	European, Ltd.	97–107	..	97–99¼
18,953,033	,,	Feb. 19	5⅞	5⅞	Gas Light & Coke 4 p.c. Ord.	18/3–19/3f	..	18/6–18/10
2,600,000	,,	,,	3½	3½	Do. 5½ p.c. max.	62–65	..	63–63½
4,294,691	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77–80	..	77–78½
5,694,095	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb.	60–63	..	59½–61½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	100–103	..	102–102⅝
161,480	,,	Mar. 5	10	10	Harrogate Cons. 10 p.c. max.	158–163*	–4	..
82,500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	98–103	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	82–85	..	..
70,000	10	Oct. 9	1	10	Hongkong & China, Ltd.	13–14	..	..
213,200	Stk.	Mar. 5	6	6	Hornsey Con. 3½ p.c.	86–89*	–2	..
2,436,594	,,	Nov. 6	25	15	Imperial Continental Cap.	350 370	+5	..
228,130	,,	Feb. 5	3½	3½	Do. 3½ p.c. Red. Deb.	75–83	..	..
235,242	,,	Mar. 5	8½	8½	Lea Bridge 5 p.c. Ord.	124–129*	–3	..
2,145,907	,,	Feb. 19	6	6	Liverpool 5 p.c. Ord.	96¼–97¼b	+1	..
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	99–101b	..	..
165,736	,,	Feb. 19	9	9	Maidstone 5 p.c. Cap.	128 133	+8	..
63,480	,,	Dec. 18	3	3	Do. 3 p.c. Deb.	54–57	..	..
75,000	5	Dec. 4	†10	†10	Malta & Mediterranean	6–6½	..	..
392,000	—	Oct. 1	5½	5½	Metrop'litan (of Melbourne) 5½ p.c. Red. Deb.	88–91	..	..
675,000	Stk.	Nov. 20	†8	†6	Montevideo, Ltd.	95–105	..	95¼
3,061,315	,,	Mar. 5	5	5½	Newcastle & Gateshead Con.	17/9–18/3df*	–/1½	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref.	72¼–74½d*	..	..
691,703	,,	Jan. 8	3½	3½	Do. 3½ p.c. Deb.	67½–68½d	..	..
277,285	,,	Nov. 5	5	5	Do. 5 p.c. Red. Deb.	98–100d	..	..
199,940	,,	Mar. 5	7½	7½	North Middlesex 6 p.c. Con.	115–120*	..	..
396,160	,,	Feb. 5	5	5	Northampton 5 p.c. max.	74–79	..	..
300,000	,,	Nov. 20	7	9	Oriental, Ltd.	100–105	–4	..
60,000	5	18 My., '15	—	—	Ottoman	0–¼	..	..
205,162	Stk.	Dec. 18	8	8	Plym'th & Stonehouse 5 p.c.	110 115	..	..
424,416	,,	Feb. 19	8	8	Portsm'th Con. Stk. 4 p.c. Std	122–127	+2	..
241,446	,,	,,	5	5	Do. 5 p.c. max.	78–81	..	..
686,312	Stk.	Jan. 22	4	4	Primitiva 4 p.c. Rd. Db. 1911	82–85	..	..
389,813	,,	Dec. 18	4	4	Do. 4 p.c. Cons. Deb.	83–86	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	8½–8⅝	..	..
1,736,968	Stk.	Aug. 28	6¼	6¼	Sheffield Cons.	105–107e	..	..
95,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	78–80e	..	..
90,000	10	June 5	†4	†5	South African	4–6	..	5½
6 709,895	Stk.	Feb. 5	5	7½	South Met. Ord.	103–106	..	103⅜–104½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	111–114	..	112½–114
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb.	59–62	..	..
734,000	,,	Mar. 5	6½	6½	Do. 6½ p.c. Red. Db.	97–100*	–2	..
91,500	,,	Mar. 5	8½	8½	South Shields Con.	107–109*	–2½	..
1,548,795	,,	Feb. 19	6½	6½	South Suburban Ord. 5 p.c.	101–104	+2	101
668,887	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	100–103	..	100½–103
647,740	,,	Feb. 19	5	5	Southampton Ord. 5 p.c. max.	73–76	..	..
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	75–78	..	..
179,014	,,	Mar. 5	8	8	Sutton Ord.	120–136*	..	..
94,500	,,	Jan. 8	5	5	Do. 5 p.c. Deb.	96–99	..	..
250,000	,,	Mar. 5	7	7	Swansea 7 p.c. Red. Pref.	96–99*	–2	..
200,000	,,	Dec. 18	6¼	6¼	Do. 6¼ p.c. Red. Deb.	100–103	..	..
1,076,490	,,	Mar. 5	6⅝	6⅝	Tottenham District Ord.	101–105*	–2	..
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	101–104*	–2	..
199,005	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	77–80	..	..
85,701	,,	Sept. 25	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	74–79	..	..
810,694	,,	Mar. 5	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	95–100*	–2	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	88–93*	–2	91
1,322,220	,,	Mar. 5	7	7	Wandsworth, Wimbledon, and Epsom Cons.	110–113*	–2	115
426,000	,,	,,	5	5	Do. 5 p.c. Pref.	93–96*	–2	96–97
1,013,464	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	100–103	..	101¼–102¼

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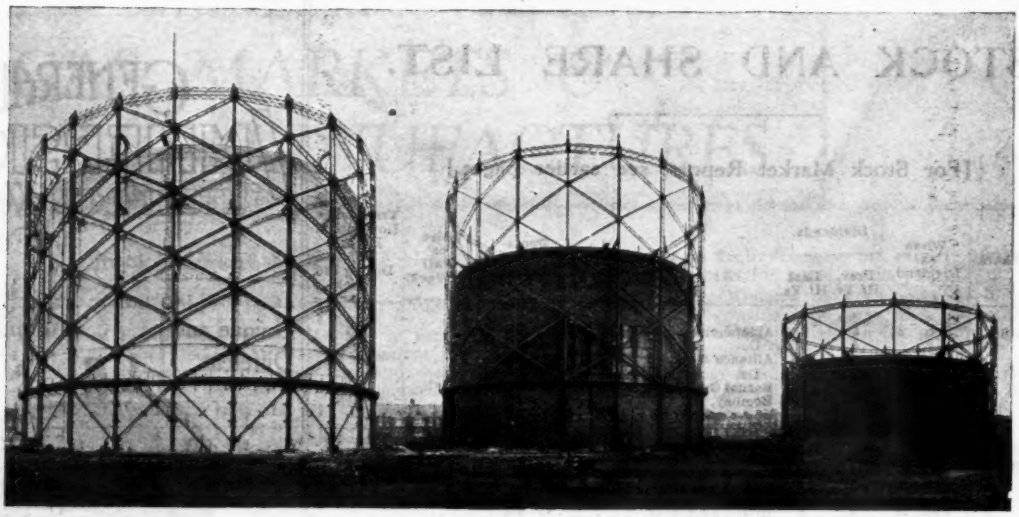

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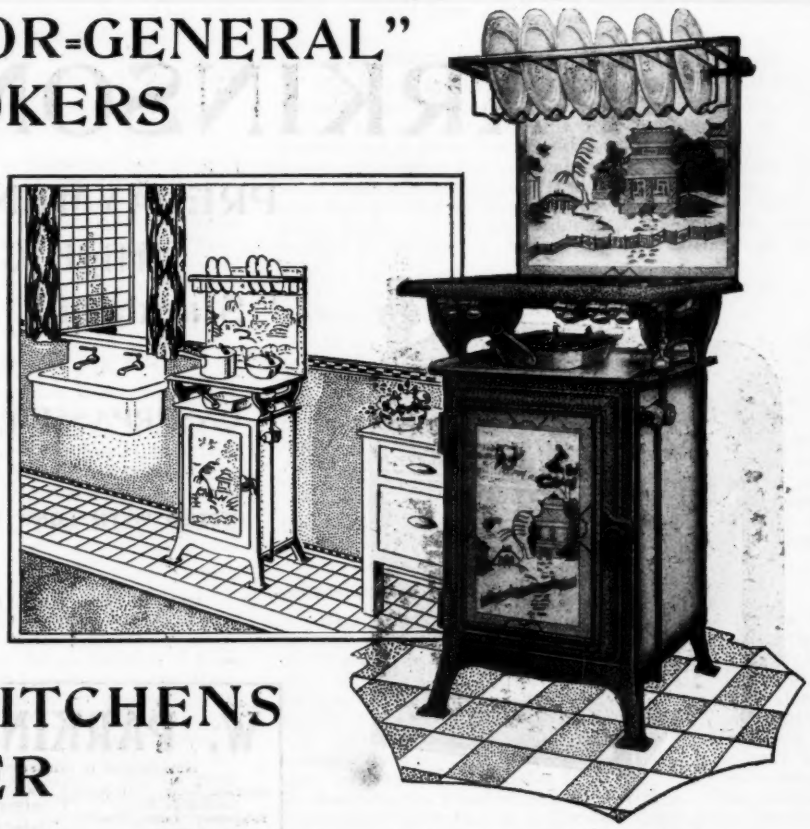

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